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STEAM SHOVEL WORK, SHOWING BOULDERS. POWER PLANT, CRUSHER AND SHAFT DERRICK IN BACKGROUND

HILL VIEW RESERVOIR, NEW YORK

Part of New Catskill Supply—Features of the Design—Provisions for Housing and Feeding Laborers and Horses—
Dump Carts, Cars, Stone Crushers, Portable Air Compressors, Steam Shovels and Other Appliances

THE Catskill water supply for New York City, the construction of which is now well under way, consists of a conduit from the impounding reservoirs in the Catskill to and across the Hudson and thence southward, passing underneath the Croton reservoir, and approximately parallel with the Hudson River to the City of New York, and through the city by deep underground tunnel carried entirely in rock and connected at intervals with the distribution system. Some of the details of this work have already been given in previous issues of MUNICIPAL JOURNAL AND ENGINEER.

In order to control the pressure within the city limits a reservoir is being constructed about one-half mile above the northern limits of Greater New York, in the city of Yonkers. The flow line of this reservoir has an elevation of 295 feet above mean water at Sandy Hook, or approximately 250 feet above the business part of the city. This is the highest point of land

in the immediate vicinity of New York and, while this particular section is as yet sparsely built upon, part of it had already been laid out in streets and it has been necessary to move or destroy several houses which had been constructed upon the site of the reservoir.

The reservoir is to be built of earth embankment lined with concrete, rubble paving and riprap. It will be roughly rectangular in shape, about 3,000 feet long and 1,500 feet wide, and will be divided into two basins by a wall which will contain a "by-pass aqueduct" connecting the uptake chamber from the aqueduct, which is here in siphon, with the downtake chamber to the aqueduct south of the reservoir, which also is in siphon. The contract, known as contract 30, includes these two shafts and a portion of each of these two tunnels. There will be a blow-off carried under the embankment at the southern end of the reservoir.



PLAN OF COMPLETED HILL VIEW RESERVOIR

Some of the largest items in connection with the reservoir construction are: 163 acres of clearing and grubbing; 250,000 cubic yards of top soil to be removed; 2,900,000 cubic yards of excavation; 1,250,000 cubic yards of special impervious embankment; 1,500,000 cubic yards of reinforcing embankment; 215,000 barrels of Portland cement; 35,000 pounds of sulphate of alumina for waterproofing concrete, mortar or grout; 60,000 cubic yards of concrete in reservoir lining, and 75,000 cubic yards in walls, chambers, etc.; 20,000 cubic yards of dry rubble masonry and paving; 27,000 cubic yards of riprap; 7,000 cubic yards of crushed stone and gravel; 80,000 pounds of steel for reinforcing concrete; 9,000 pounds of miscellaneous cast iron, wrought iron and steel. A further idea of the magnitude of the work may be gained from the fact that, although it is expected that the contractor will use all diligence consistent with economy in prosecuting the work, he is allowed five years by the contract for getting one basin ready for filling with water, and all work, including tests of the reservoir and cleaning up of the grounds, is expected to take six years and four months.

Work of clearing off the grounds was begun the first of this year, and the clearing and stripping of top soil is well along toward completion, and the trenches for the blow-off and the by-pass aqueduct are well under way. The quarters for the men, including mess hall, wash houses, hospitals, store, etc., are many of them completed and all will be ready within the next few weeks. The same is true of the stables. The machine shop was completed, but was burned down about the middle of July, but will soon be rebuilt. Opposite the machine shop is the blacksmith shop.

The contractor for the reservoir and other work of contract 30 is the Keystone State Construction Company, of Philadelphia. The company is already employing about 900 men, which number will be considerably increased next season, if not this one. The reservoir work will probably be very largely intermittent during freezing weather, but the tunnel work will be continued regardless of outside weather conditions. The tunnel work includes 39,500 cubic yards of excavation in 2,970 linear feet of tunnel, for lining which 14,400 cubic yards of concrete will be required.

A considerable portion, approximately one-half, of the rock required for concrete work will be obtained from the excavation of tunnels and shafts, in addition to which considerable stone is being obtained from the reservoir itself which will probably be used for the same purpose. The top five or ten feet of the excavation is found liberally sprinkled and filled with stones and boulders of all sizes from small gravel up to



STRIPPING AND LOADING TOP SOIL INTO CARS

three or four cubic yards. Those which can be handled by cart or stone boat are being hauled by these conveyances to the outer edge of the embankment and deposited there temporarily. The larger ones are being drilled and blasted into pieces which can be disposed of in the same way. There are two stone crushers at work, one near each shaft, and consequently at opposite ends of the reservoir, and these have begun accumulating the broken stone which will be required later for concrete. As the stone is brought up from each shaft it is deposited directly on a pile alongside the crusher. The crusher is set with its foundation somewhat below ground level and the broken stone is brought to it by gravity, assisted by shovels in the hands of one or two laborers. From the crusher it is taken by a bucket elevator to the top of a high wooden trestle, where it is screened into two sizes, the smaller being dust and the smallest of particles. The stone falls upon two belts, one for each grade, which convey it to the ends of long horizontal arms from which it falls into two piles. It will thus be possible to store the stone in piles each about 50 feet high. This will be necessary, as most of the concrete will be used only at the latter end of the work, while the excavation of the rock has already begun and will continue for the next two or three years. In order to prevent the fine dust creating too much of a nuisance and being almost entirely blown away as it falls from the end of the belt conveyor, it is dropped into the top of a long vertical spout formed of canvas suspended from the end of the arm and falling to within 15 or 20 feet of the ground.

The rock is raised from the shafts and tunnels and the concrete lowered into the same by an ordinary boom derrick. The contractor is required to operate all drills and other machinery



STONE CRUSHER AND DERRICK AT SHAFT. STEAM SHOVEL AND DUMP CARTS

and tools within the tunnel and shafts by electricity, compressed air or hydraulic power. Compressed air has been chosen by the contractor for this work, as also for the two miles of tunnel immediately north which forms a separate contract.

In clearing the site, the trees were cut into cord wood and all brush, stumps, etc., were piled and burned or otherwise disposed of. All roots of more than one inch diameter within the lines of the embankment of the reservoir are grubbed out. The top soil is found to extend down seven or eight inches. In estimating this for payment no effort is made to measure the exact depth, but it was agreed that the payment should be made on the basis of 12 inches. This top soil is deposited temporarily outside of the lines of the embankment, and will be used after the completion of the reservoir in dressing the banks and in landscape work generally. Such manure from the stables as the contractor does not otherwise dispose of he is permitted to deposit mixed in with this top soil. This work is necessarily done entirely by hand with grub hoes, axes, and shovels, and is removed by carts.

The excavation is being done by steam shovels and the soil thus excavated is being removed by the cars and carts. It is believed that all of the excavation will be in clayey loam, and that there will be no ledge rock; 21 test pits sunk to grade having indicated these conditions. Two of the steam shovels

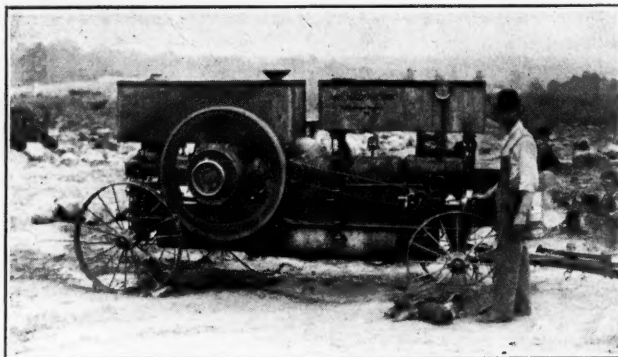


CUTTING BYPASS TRENCH

are those manufactured by the Ohio Steam Shovel and Dredge Company, one is a Marion shovel model 60 and one a Bucyrus shovel; the two last being of larger capacity than the two first named. The smaller shovels deposit the excavated material directly into Troy dump wagons, of which about 100 are used on the work. The larger shovels are used to load dump cars of two kinds; one, steel cars manufactured by Arthur Koppel and Company; the other, ordinary wooden body side dump cars. These are hauled over portable contractors' track to the point where needed for embankment. The wagons hold about one yard and are filled by dropping two half-yard bucketfuls directly from the dredge bucket. The average speed is a wagon load every 50 seconds.

Large boulders which are uncovered by the steam shovels are allowed to roll to the bottom of the bank, where they are later blasted into smaller pieces. For drilling these boulders the contractor uses drills operated by a portable compressed air outfit, consisting of an Ingersoll-Sargeant air compressor operated by an Abenague gasoline engine. This makes an exceedingly convenient portable appliance for the rapid drilling with power drills.

The embankment is of two classes, known as "ordinary embankment" and "special impervious embankment." The former is deposited in 24-inch layers and is not rolled; although it is pretty well packed by the hauling which is done over it. Loose stone, tunnel muck and similar materials may be placed near the outer face of this embankment, but must be covered with sufficient thickness of earth, well worked in, to prevent future



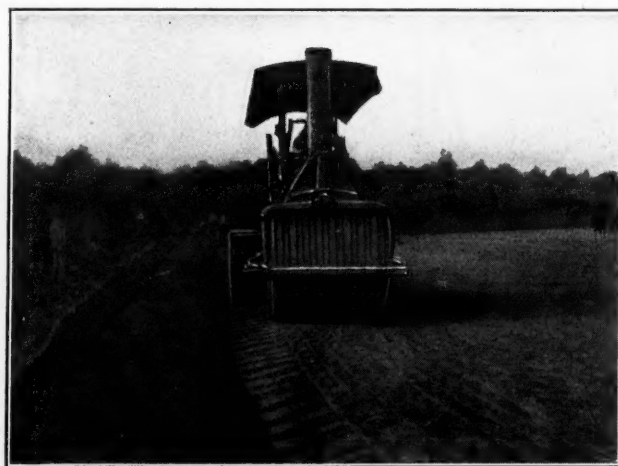
PORTABLE AIR COMPRESSOR

settlement. However, no stumps or any perishable material can be used in any part of the bank. The impervious embankment is laid with an inside slope of about two to one and an outside slope of about one to one, and is deposited in layers which, when rolled, are not more than 4 inches thick. The material is dumped from the Troy dump wagons in a line along the outer edge of that previously dumped and rolled, and is spread to the desired thickness by means of an ordinary steel Champion road scaper. From this material all stones larger than an inch or two in diameter are carefully removed (it is intended to deposit no material in this embankment which contains any such stones, and the majority of it contains no stones of any kind). Previous to depositing the dirt the layer immediately beneath is given a thorough sprinkling with Studebaker sprinklers. After the earth has been leveled off it is rolled with a Buffalo steam roller, the front wheels of which are provided with grooves passing around the circumference, the driving wheels being provided with elevated ribs set diagonally on the face of the wheel. This makes two sets of grooves in the soil approximately at right angles with each other and produces a very compact bank. The roller moves backward and forward, working gradually from the surface previously rolled to that newly deposited.

Both kinds of embankment, but especially the impervious embankment, are carried up in horizontal layers, no slope greater than 1 to 10 in any direction being allowed.

In measuring up the embankment, it is assumed that this starts from a base one foot below the original surface of the ground; this conforming with the assumption that one foot of top soil was removed before embankment was begun.

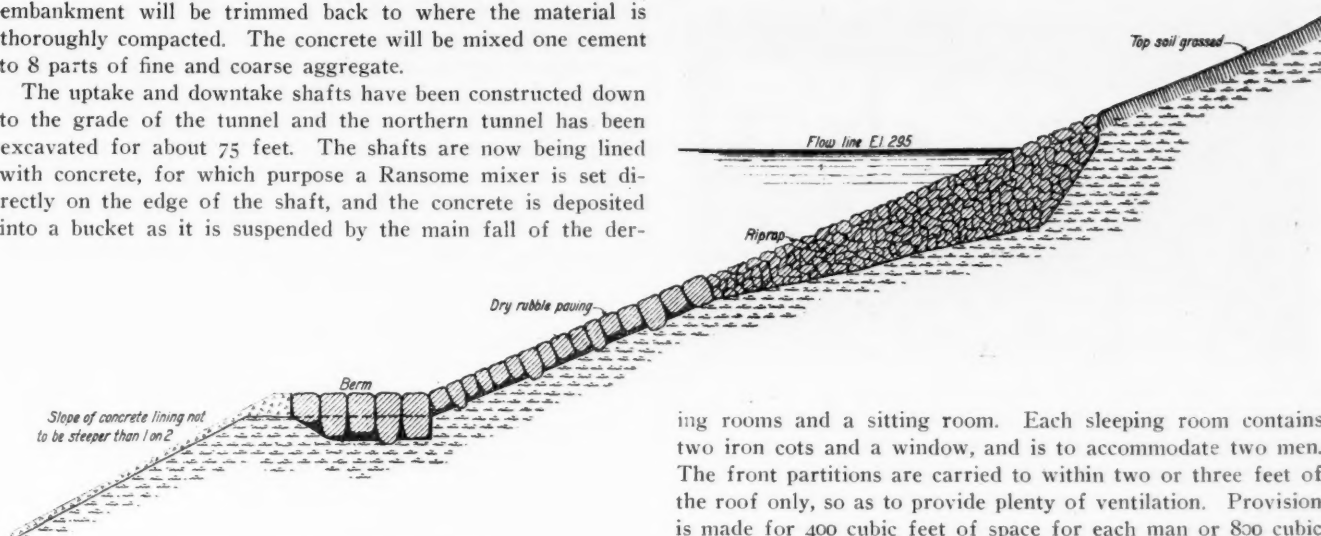
The reservoir will be lined with concrete on the bottom and up the slope to a berme located one-half to two-thirds the distance from the bottom to the top of the embankment; this lining having a slope of one to two. The berme and the bank for a short distance above it will then be paved with dry rubble, and above this to somewhat above the flow line will be paved with riprap. Before any of the paving, the inside slopes of the



ROLLING EMBANKMENT

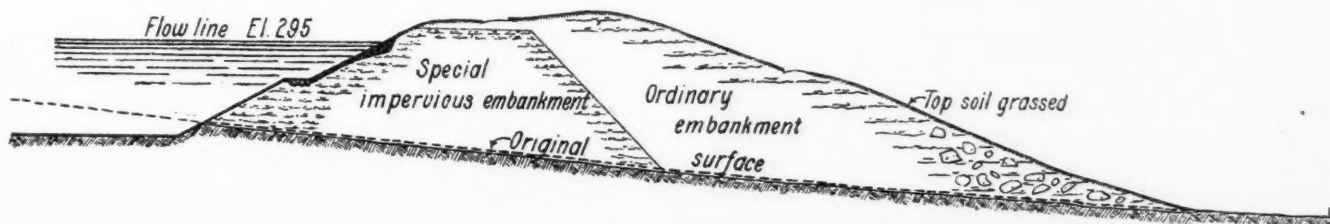
embankment will be trimmed back to where the material is thoroughly compacted. The concrete will be mixed one cement to 8 parts of fine and coarse aggregate.

The uptake and downtake shafts have been constructed down to the grade of the tunnel and the northern tunnel has been excavated for about 75 feet. The shafts are now being lined with concrete, for which purpose a Ransome mixer is set directly on the edge of the shaft, and the concrete is deposited into a bucket as it is suspended by the main fall of the der-



TYPICAL INNER FACE OF BANK

rick and is then lowered to the desired point around the wall of the shaft. This makes a very economical arrangement, the concrete being handled but once between the mixer and its final position. Concrete for shafts and tunnels is mixed one cement to six of fine and coarse aggregate; the former being sand or screenings from dust to $\frac{1}{4}$ -inch; the coarse, from $\frac{1}{4}$ -inch to 2 inches.

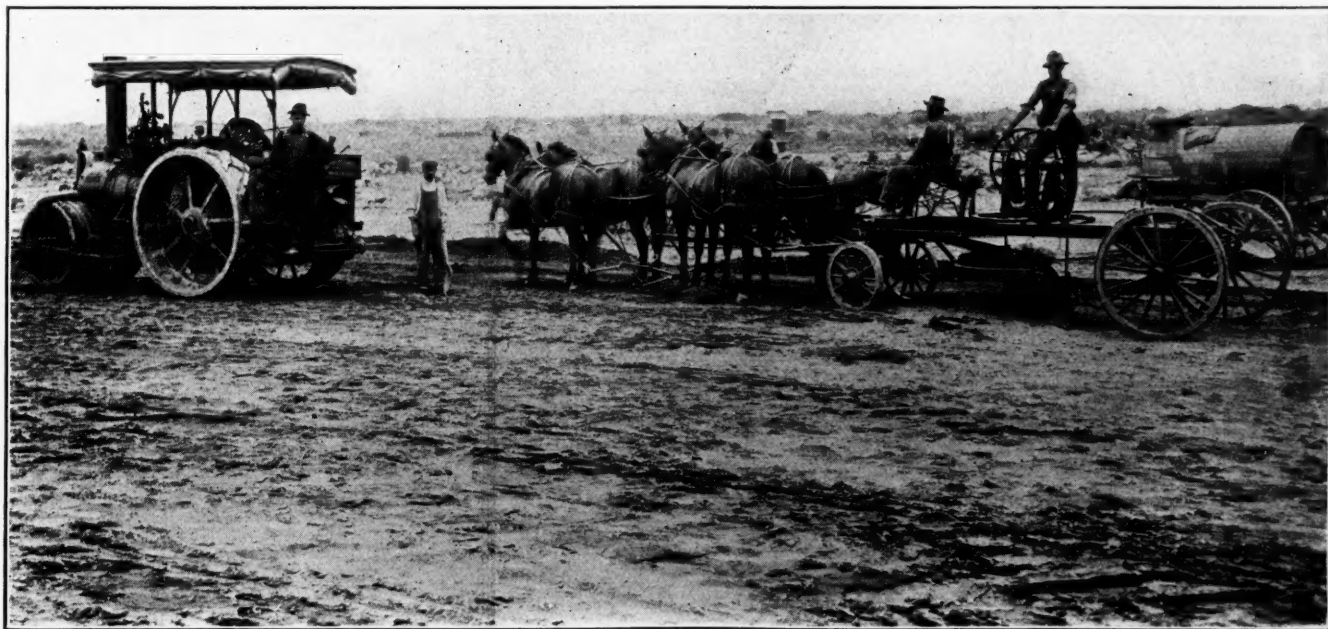


TYPICAL SECTION OF EMBANKMENT

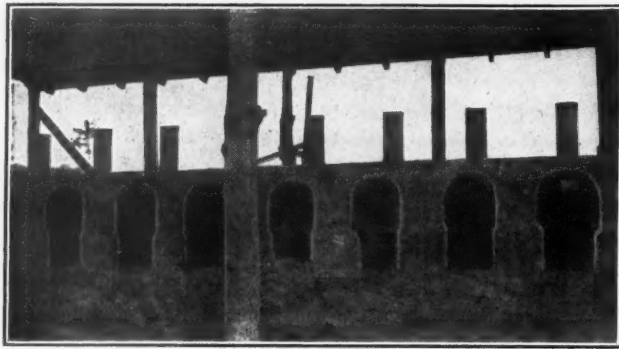
Not the least interesting part of the contractors' outfit on this work is the provision for housing the men and horses. The houses are built all of one pattern. The floor is raised several feet above the ground and a central passage five feet wide extends from the front door to the rear. On one side of this are seven sleeping rooms and on the other side six sleep-

ing rooms and a sitting room. Each sleeping room contains two iron cots and a window, and is to accommodate two men. The front partitions are carried to within two or three feet of the roof only, so as to provide plenty of ventilation. Provision is made for 400 cubic feet of space for each man or 800 cubic feet in each room. Most of the men are expected to board in the mess halls, of which there are several, two of these being for blacks and the rest for Italians. Adjacent to the mess halls are wash houses, each provided with a long sink and abundance of flowing water. Here they are supposed to "wash up" before meals and may also wash their clothing. It is supposed that some of the men may want to board themselves and provision is made for 72 such; such provision including outdoor cooking ovens, of which at present 20 have been

built, but it is expected to increase this number. These ovens are small brick affairs with open fronts and four cast-iron grate bars on which frying pans, pails, etc., may be set. The ovens are placed in two sets back to back, each pair of ovens having a common chimney of cement pipe. The mess halls are run in most cases by a married couple with one or two assist-



APPLIANCES USED IN MAKING EMBANKMENT. SCRAPER, SPRINKLER AND ROLLER



OVENS. FLOOR AND BUILDING NOT YET BUILT.

ants. The sanitary conveniences are in a building by themselves. Immediately adjacent to these and in the same building is an incinerator in which are burned all excreta (the closets are operated on the "pail system"), garbage and other putrescible and objectionable matter. There is also a store for the sale of provisions, clothing, etc. One building set apart from the others will be used as a hospital, at which a physician and surgeon is constantly in attendance.

There are four stables, each containing 28 stalls, each stall being intended for two horses. The stalls are arranged in two rows of 14 each, and a trough running between these rows the entire length of the building serves as a common watering trough for all the stalls, so that fresh water can be supplied to all the horses with the greatest convenience. A passageway on each side of the building, at the rear of each row of stalls, is left of ample width to permit a wagon to pass through and remove old straw and manure and bring in fresh straw, feed, etc. There is also a hospital stable arranged in the same way but with provision for 20 horses only. There is in addition a granary building where all feed, etc., is kept.

Two large buildings have been constructed and made approximately air and water tight, with floors elevated several feet above the ground, for the storing of cement. Among other buildings connected with the work are the headquarters of the Board of Water Supply Police (the Board maintains a considerable police force which patrols all of the areas owned

or controlled by the Board, their duties and powers being generally those of ordinary police, but their special duties having to do with the preservation of the sanitary conditions of water-sheds and camps). The engineering corps have a large and convenient office building immediately adjacent to the work, and the contractors also are provided with an office.

As stated previously, the reservoir work is being done by the Keystone State Construction Company, of Philadelphia.

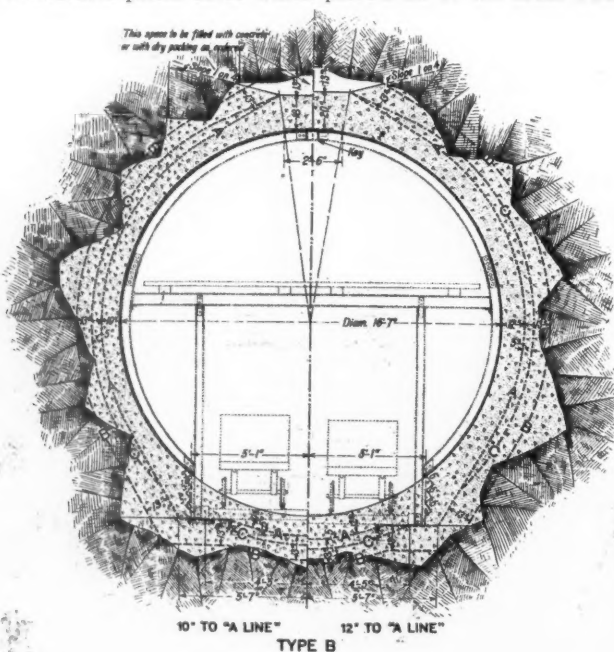
About two miles of aqueduct has been let to George W. Jackson, Inc., of Chicago, and work on this also has been started. This contractor will use compressed air for all his tunnel machinery and has made most elaborate preparations for an air compressing plant. In a large building are concrete foundations designed for carrying six air compressor units, these foundations having been carried down to bed rock. Ingersoll-Sargeant air compressors will be used, of which one unit having a capacity of 2,000 cubic feet per minute is already in operation. There will be one or more additional units of the same capacity and probably two or three others of somewhat smaller capacity. These are operated by current purchased from the Yonkers power plant. It is estimated that about 11,000 cubic feet of air will be required as a maximum for working the two miles of tunnel. This one air compressor plant will furnish air for the entire contract, which will be carried in steel pipe to the several shafts. Adjacent to the compressor house is a most complete machine shop, the foundations of the machinery also being of concrete carried down to bed rock.

Mr. Chas. E. Wells is the Division Engineer in charge of the Hill View division, which includes the Hill View reservoir and the aqueduct siphons for about 2 miles north and one-half mile south of the same. The southern department, which includes this work and also the aqueduct for several miles further north, beyond the Croton watershed, is in charge of Department Engineer Frank E. Windsor.

MACHINE CALKING OF IRON PIPE

THE Consolidated Gas Company of New York has used compressed air for calking some of its gas mains, and calking in this way would seem to be well worth consideration where there is sufficient amount to make the use of a compressed air machine economical. Especially in large pipes the calking at the bottom of the joint is frequently less complete and effective than at other parts of the same, partly because it is out of sight of inspection and partly because of the awkward position of the workman in doing the calking. A test of hand and machine calking was made on a 48-inch main on a wet trench in the Bronx. It required $2\frac{1}{2}$ hours to yarn the joint and seven hours to calk with lead wool, or one joint completed by two men in a day. Three and one-half inches of tarred rope was rammed in as yarning and $2\frac{1}{2}$ inches of lead wool, or about 160 pounds, calked in on top of this.

With the compressed air machine the same quantity of yarn was used, but it was soon noticed that 187 pounds of lead wool was being forced into the joints without filling it any more completely than the 160 pounds had with hand calking. The yarning process was still done by hand, as no tool has been perfected for this purpose, but it is expected that such will be available before long. In using the compressed air machine two men were at a joint, one on either side of the main. The calking at the bottom is made as good as at any other part of the joint, as the blow of the calking machine is always the same. It was found that two joints on the same line of pipe could be completely yarned and calked by two men in a ten-hour day, as against one joint with hand calking, in addition to which the joint is of uniform tightness throughout the entire circumference. The air compressor for this work was made by the Ingersoll-Rand Company and was driven by a 15-horsepower Abenague gas engine, the whole mounted on a truck which was hauled by a team of horses. The gas engine consumes about 10 gallons of gas a day and a pressure of an average of 60 pounds per square inch is maintained.



QUANTITIES PER LINEAR FOOT				HYDRAULIC ELEMENTS	
10" to 24" and 6" to 24" line					
Excavation	Cu. Yds.	12.5182	12.8118	Area of waterway	215.09 sq. ft.
Concrete		4.3316	4.7290	Wetted perimeter	82.10 ft.
Dry Packing		0.1870	0.1891	Hydraulic radius	4.146 ft.

SECTION OF TUNNEL

LEAKS IN RIVER CROSSINGS

It is pretty well established that in the majority of piping systems, whether of gas or water, there is considerable loss by leakage, a considerable part of this being at the joints between the pipes. In most clayey soils or others in which the water can not easily drain away, indications of the leakage will appear at the surface in the form of dampness or even of a continuous flow. In porous soils, however, and where under other conditions the water can find another exit no indication of leakage is given in this way. Possibly the location where the greatest difficulty is experienced in locating leaks is at river crossings where the pipe is laid beneath the water surface. An illustration of this was furnished at Perth Amboy a few weeks ago, when it was found that something less than one-half million gallons of water per day was escaping into the Raritan river where the pipe line crossed under water.

There are several ways of determining whether river crossings are leaking, one of them being to close the stop gate on the further side (making sure that there is no leakage by it), then either inserting a meter or pitometer to determine whether there is any water passing into the river crossing, or almost closing the valve on the near side of the crossing and determining by the "singing" whether there is any water passing through the same. A method of more exactly locating the leaks, as well as determining whether there are any such, is to connect an air pump with the river crossing, close both ends absolutely tight and force air into the crossing pipe. Bubbles of air rising to the surface will then indicate the position of the leaks. This, of course, would be an undesirable elaborate method to employ for determining whether or not the pipe was leaking, but is probably the best for locating the position of leaks.

BOSTON'S NEW SMOKE LAW

BOSTON, MASS., has suffered considerable annoyance in the past from the effects of smoke. The defacement of her public buildings and private residences has been a reflection upon the city. In addition to this the destructive effect upon the foliage, and all kinds of vegetation, as well as the effect upon the health and comfort of her citizens, called loudly for action. No one has any more right to contaminate the air we breathe than he has to defile the water we drink. The smoke law, if rigidly enforced, will reduce this nuisance to a point where its injurious effects will be practically eliminated.

In Chicago, statistics were recently compiled which showed that there was a yearly decrease in the mortality rate due to acute contagious diseases of 13 for each 100,000 of population; a decrease of 12 from diseases due to impure water; a decrease of 11 from causes due to impure food, while the diseases resulting from impure air, such as pneumonia, bronchitis, and consumption, showed an increase of about 22 for each 100,000 of population. No doubt there are other factors which are perhaps as potent as smoke in the defilement of the atmosphere, but if we can eliminate even one of the contaminating influences, it will be a step in the right direction.

The territory covered by a new Smoke Law Act includes not only Boston, but also that part of Boston Harbor lying westerly of a line drawn from the southeastern point of Deer Island to a northeastern point of Long Island, and the contiguous cities of Cambridge, Somerville, Everett, Chelsea, and the Town of Brookline. Under this law both the railroads and public service corporations are included, as well as all other users of smoke-stacks. The consumers of coal have been allowed three years in which to prepare themselves for the final provisions of the law, which take effect in 1913. This will give all subject to these provisions ample time in which to make alterations in their plants and such changes as may be necessary in order to comply with the law.

Already there are evidences that the smoke nuisance in Boston is going to be considerably abated even in the first months of the law's operation. The steamers Harvard and Yale of the

Metropolitan Line are burning oil, which entirely eliminates the smoke. The Boston, Revere Beach and Lynn Railroad is to experiment with two modes of gasoline-driven rolling stock, and if the trials prove a success, the fuel of the road will doubtless be changed from steam to gasoline in the near future. Also, some of the large public service corporations in Boston are preparing plans for the remodeling of their plants, and are arranging for the installation of modern smoke-consuming devices.

The enforcement of the law is in charge of the Board of Gas and Electric Light Commissioners, and while it would be unwise for the public to annoy the board with every slight offense on the part of any chimney, the board would nevertheless appreciate being notified of violent and repeated infringement.

The thanks of the community are due to the Fuel Supply Committee of the Chamber of Commerce, which has at last given Boston a practical and workable Smoke Law. (*Boston Chamber of Commerce Journal*.)

A BRICK PAVING PROBLEM

THE village of Saranac Lake, N. Y., has about a mile of brick pavement, the greater part of which was laid in 1909 with Mack blocks laid on a 6-inch concrete foundation with a 2-inch sand cushion and cement joints, a $\frac{3}{4}$ -inch expansion joint of paving pitch being placed along each curb and transversely at intervals of 25 feet. This spring longitudinal cracks were found in the pavement following a line of joints and breaking the alternate bricks in the same line, the cracks being from 100 to 150 feet long. Most of these cracks are on high ground, three or four being on grades or at the vertical curve connecting a 2 or 3 per cent grade with a 5 per cent grade. The width of the pavement varies from 35 to 40 feet and most of the cracks are from 5 to 8 feet from the curb, which is of concrete. Brick have been removed in several places along the line of the crack and the foundation underneath found to be in first-class condition. The village engineer, Mr. John S. Collins, who furnishes the above information, states that the winters are quite severe, the mercury frequently reaching 20 to 30 degrees below zero. From 8 to 15 inches of snow and ice forms on the pavement during the winter, the central 15 or 20 feet thawing in the early spring some time before that on the sides of the roadway. The cracks apparently developed during the latter half of March when the weather suddenly became quite warm. Mr. Collins is anxious to learn whether other engineers have had similar experience and if so whether they have determined the cause. Also how repetitions of the same can be avoided.

LIGHTING COMPETITION AVOIDED

THE Public Service Commission of New York State has, we believe, done a distinct service, although one which in itself is of but small importance compared with many acts of the commission, in arranging to prevent duplication of an electric light plant in the village of Richfield Springs, and thus setting an excellent precedent and example. A company which for some time had been furnishing light to the village had permitted its plant to fall into a condition which did not allow it to give the best of service, and another company had applied for a charter and permission to furnish electric light in the same village. The aim of the village in encouraging competition was better service and lower rates; but there was not enough service to enable two companies to exist, and the inevitable result would have been the failure of one company or the combination of the two, followed by even higher rates than at present. The Commission did what it should be the aim of every village or city under like circumstances to do—used sufficient persuasion and pressure upon the original company to induce it to put its plant in first-class condition and contract to furnish the public lighting on reasonable terms.

DUST PREVENTION EXPERIMENTS

With Tar, Oil and Artificial Asphalt Preparations, Cement, Slag and Brick—By Office of Public Roads and Cornell University

EXPERIMENTS with the above-named materials were conducted last year at Ithaca, N. Y., by the Office of Public Roads of the United States Department of Agriculture with the co-operation of Cornell University, which latter furnished all stone, machinery and labor. Manufacturers donated bitumens, brick, cement and slag and the Office of Public Roads paid freight charges and supervised the work. When they desired, the manufacturers had representatives present during the application of their materials. It was the intention to test each bituminous binder by both the penetration and mixing method; work was begun so late in the summer, however, that it was found impossible to finish it that season and work was stopped in December. The brick was laid on the section of road subject to the heaviest traffic, but the other materials were laid in the order of their arrival. The experimental materials were laid on a road known as the Forest Home drive, extending 3,000 feet between Sibley College and the city limits, and the experiments were continued about 900 feet further onto the State road between Ithaca and Dryden. The road is subjected to rather heavy auto traffic and a considerable amount of country traffic the year round. About 800 feet receives a large amount of heavy hauling. The first 850 feet passes over a well-formed foundation of gravel, but 200 feet is on a 6 per cent grade. On a part about 300 feet long, clay bearing quicksand had been exposed by grading and this was excavated to a depth of 4½ feet and refilled with shale and well rolled, giving a very fair



SHALE FOUNDATION ON QUICKSAND

foundation. Another section of quicksand about 400 feet long was drained by a 5-inch tile laid along the uphill side, which appeared to give a satisfactory foundation without replacing it with shale.

In each of the experiments the labor was unskilled common labor. This was figured at \$1.50 per day, foremen \$3, two-horse teams \$3.50. The stone used was a hard, blue limestone costing 65 cents per ton f.o.b. 60 miles away; the freight amounting to 50 cents per ton. The costs of constructing the several sections were excessive owing to the shortness of each section and the consequent necessity of rearranging the labor with change in the character of work. The crude machinery and heating apparatus also added greatly to the cost.

When the office took charge, 300 feet of a first course of stone had already been laid, consisting of 1½ to 3½-inch stone, 4 inches deep when loose. After rolling, a sand filler was applied until all voids were filled and the road again rolled. A ¾-inch crown was adopted for all bitumen work. The bitumens were heated in a 10-barrel tank fitted with a fire box and mounted on wheels. Scrap wood was used for fuel. The bitumens were fed into the tank through a manhole in the top and drawn off through a spigot placed just over the fire box. When fresh cold bitumen was added this would settle to the bottom and clog the valves, and two two-barrel iron soap kettles were used for heating bitumen while the large tank was being recharged; but in spite of this the work was often delayed for lack of hot material. Bitumen which was sufficiently soft to flow was drained into the tank by simply placing the barrel on

skids on the top of the tank and knocking in the head. As there was room for but one barrel at a time the filling of the tank proceeded slowly. For heating the stone, two flat ¼-inch steel stone heaters, each having a heating surface of 80 square feet, and a semi-cylindrical section of an old boiler were employed, the last mentioned for screenings. Both bituminous and cement concrete were mixed with an old type McKelvey concrete batch mixer driven by gasoline engine. In the bituminous mixtures there was some segregation of the various sizes of stone, the finer sticking to the sides of the discharge funnel and the coarser coming out first. An old 12-ton steam roller was used in the greater part of the work, but toward the end was replaced by a new 10-ton roller.

There were 14 experiments, the first two using refined coal tar by the penetration and mixing methods respectively; the third and fourth, artificial oil asphalt by the mixing method; the fifth and eighth, refined semi-asphaltic oil by the penetration method; the sixth, a semi-solid oil of the same kind by the penetration method; the seventh, refined water gas tar by the penetration method; the ninth, refined water gas tar and slag by the penetration method; the tenth, Kentucky rock asphalt; the eleventh, open-hearth slag; the twelfth, cement concrete and bituminous-surfaced cement concrete; the thirteenth, ash cement concrete, and the fourteenth, brick. The general proportions used and the costs of these experiments, except those of Nos. 10, 11 and 14, are given in the accompanying table; the three named not being susceptible to comparative tabulation with the others.

In section one the wearing course was of stone 1½ inches to ½ inch in its largest dimensions, laid 4 inches deep when loose. As it contained considerable fine material and was damp when laid, a steel harrow was used to stir it until dry and to work all dust to the bottom. This proved very satisfactory and left a fairly even surface of coarse stone on top, which was then rolled until firm. The coal tar binder was very viscous and flowed slowly from the barrel when cold; because of which, the tar was warmed for some time before attempting to load the heating tank, by placing the barrels near a coke fire. When heated to between 250° and 280° F. the tar was drawn off into coal skuttles fitted with strips of metal riveted across their spouts so as to give an opening 4½ inches across and ½ inch wide. With these the hot tar was poured upon the prepared road surface at the rate of about 1½ gallons per square yard. A light coat of screenings was then applied and rolled, more screenings being applied from time to time until the surface became firm. After about two weeks of use the surplus screenings were swept from the surface with rattan hand brooms. A lighter tar was then poured upon the surface hot and broomed in, being applied at the rate of ½ gallon per square yard. Screenings were again applied in sufficient quantity to fill all surface voids and take up the surplus tar. This made the surface smooth and solid when rolled.

In experiment No. 2, 1½-inch to ½-inch stone was laid to a depth of 1½ inches on the foundation and rolled until firm. The wearing surface was mixed in a concrete mixer and was composed of six parts by weight of 1½ to ½-inch stone and one part of ½ inch to dust, which were heated. The coarse stone was then dumped into the mixer and about 6 per cent of hot tar added; and after the mixer had made two turns the screenings were dumped in and the mixing continued until the stone had become thoroughly covered with tar. The mixture was dumped upon a platform from which it was shoveled into wheelbarrows, taken to the road and spread to a depth of 2½ inches. The larger stone furnished for this experiment was not uniform and a segregation was found to take place in discharging from the mixer.

After this mixture had been spread a light coat of stone chips was spread over the surface to keep the tar from sticking to the roller wheels and the whole was well rolled, more chips being added as required. The surface was then painted with about ½ gallon of tar to the square yard. Enough stone chips were then added to take up all the surplus tar and fill the voids.

MATERIALS AND COST DATA OF EXPERIMENTS AT ITHACA, N. Y.
PENETRATION METHOD

DESCRIPTION				QUANTITY OF MATERIAL				COST DATA PER SQUARE YARD, IN CENTS										TOTAL COST	
Experiment No.	BINDER	Length of Section (feet)	Area of Section (square yards)	No. 2 Stone (cubic yards per square yard)	Screenings (cubic yards per square yard)	Binder, First Application (gallons per square yard)	Binder, Second Application (gallons per square yard)	No. 2 Stone at Siding	Screenings at Siding	Hauling and Laying Stone	Binder	Hauling Binder	Heating and Applying Binder	Rolling	Miscellaneous	Freight on Binder	Per Square yard (cents)	Entire Section	
1	Refined coal tar.....	300	620	0.111	0.022	1.46	0.56	14.55	2.91	5.27	12.41	2.84	2.02	0.92	1.00	4.00	45.92	\$284.70	
5	Refined semiasphaltic oil.....	300	533	.111	.022	1.50	.....	14.55	2.91	5.27	17.25	2.92	1.50	.92	1.00	3.00	49.32	262.88
6	Semisolid refined semiasphaltic oil.....	300	533	.111	.022	1.64	.....	14.55	2.91	5.27	11.48	3.19	1.64	.92	1.00	2.36	43.32	230.90
7	Refined water-gas tar.....	300	533	.111	.022	1.88	.....	14.55	2.91	5.27	13.16	3.65	1.88	.92	1.00	3.61	46.95	250.24
8	Refined semiasphaltic oil.....	300	533	.111	.022	2.06	.....	14.55	2.91	5.27	14.42	4.01	2.06	.92	1.00	7.16	52.30	278.76
9	Refined water-gas tar (slag).....	100	178	.138	.022	1.47	.....	30.28	4.83	8.40	10.29	2.86	1.47	.92	1.00	2.82	62.87	111.91

MIXING METHOD

DESCRIPTION				QUANTITY OF MATERIAL					COST DATA PER SQUARE YARD, IN CENTS										TOTAL COST	
Experiment No.		Length of Section (feet)	Area of Section (square yards)	No. 2 Stone (cubic yards per square yard)	Mixed Stone (cubic yards per square yard)	Screenings (cubic yards per square yard)	Binder in Mixture (gallons per square yard)	Binder Used in Paint Coat (gals. per square yard)	No. 2 Stone at Siding	Screenings at Siding	Hauling and Laying Stone	Binder	Hauling Binder	Preparing and Laying Mixture	Heating and Applying Paint Coat	Rolling	Miscellaneous	Freight on Binder	Per Square yard (cents)	Entire Section
2	Refined coal tar. . .	300	622	0.042	0.069	0.022	0.92	0.44	14.55	2.91	5.27	11.56	2.65	10.32	0.44	0.92	4.52	2.88	56.02	\$348.44
3	Artificial oil asphalt.	275	489	.042	.069	.022	.92	.....	14.55	2.91	5.27	9.28	1.79	10.32	.....	.92	4.52	9.06	58.62	286.65
4	Do.....	260	463	.....	.069	.022	.92	.98	9.09	2.91	3.29	14.25	3.70	18.59	.98	.92	4.52	2.64	60.89	281.92

CONCRETE

DESCRIPTION		QUANTITY OF MATERIAL						COST DATA PER SQUARE YARD, IN CENTS										TOTAL COST		
Experiment No.	BINDER	Length of Section (feet)	Area of Section (square yards)	Coarse Aggregate (cubic yards per square yard)	Sand (cubic yards per square yard)	Cement (cubic yards per square yard)	Bitumen (gallons per square yard)	Coarse Aggregate at Mixer	Sand at Mixer	Cement at Mixer	Mixing and Laying Concrete	Bitumen	Hauling Bitumen	Heating and Applying Bitumen	Screenings on Road	Freight on Bitumen	Miscellaneous	Per Square yard (cents)	Entire Section	
12a	Cement concrete	500	889	0.140	0.052	0.026	.....	23.10	3.91	29.30	17.28	.....	.....	.....	.....	.....	.....	1.18	74.77	\$664.70
12b	Bitumen coated, cement concrete	30	53	.140	.052	.026	0.84	23.10	3.91	29.30	17.28	6.30	1.64	0.84	1.00	1.17	.....	1.18	85.72	45.43
13	Ash cement concrete	35	62	.138	.045	.017	.....	4.27	3.38	19.42	20.16	.....	.....	.....	.....	.....	.....	1.18	48.41	30.01

At first this section presented a smooth, fine surface, but in about two months one spot showed signs of raveling and four small patches were made by cutting out the defective surface and replacing with hot stone, after which tar was poured over the new stone and the surface well tamped.

In experiment No. 3 the wearing course was mixed in the same manner as in experiment No. 2, except that in place of tar an artificial oil asphalt was used, heated to between 250° and 300° F. This material was received in sheet-iron drums holding about 56 gals. each. It was found convenient to cut the ends of the drums free and also cut a seam down the side. The drums were then rolled upon two small iron rails over a fire which produced a thin layer of melted oil next to the metal, permitting the casing to be easily removed. The cakes of asphalt were then cut up by means of a wire and thrown into the tank heater. After being mixed, the coated stone was hauled by wagons 500 feet, dumped upon a board and shoveled into place; this method of handling producing a much more uniform mixture than was obtained in experiment No. 2. It was found that the asphalt-coated stone could be rolled without adding stone chips. It did not require a paint coat of bitumen and was completed by rolling in stone chips as in the first two sections.

In experiment No. 4 a foundation course of crushed limestone from 2 to 4 inches in size was laid $5 \frac{2}{3}$ inches deep, a sand filler added, and it was then rolled solid. A course of bitumen-covered stone was laid directly upon this foundation in the same manner as in experiment No. 2, an artificial asphalt being used as a binder. The oil asphalt was shipped in 42-gallon barrels which had been coated inside with whitewash which made it possible to remove the staves from the material. Cold, damp weather very much handicapped this work. This wearing course did not bond well and had to be painted in order to obtain a satisfactory surface.

Experiment No. 5 was constructed in the same manner as No. 1, except that a rather fluid semi-asphaltic oil was used.

This material was viscous and slightly sticky and could be easily handled and run from the barrels into the tank wagon. It was heated to between 210° and 240° F. before application. It was found unnecessary to paint this section, since the oil worked to the surface under the action of the roller after applying stone chips. This was in good condition when examined last winter.

The sixth section was built in the same manner as the fifth, except that a different semi-asphaltic oil was used, having a specific gravity of 0.985 as against 0.955, a per cent of loss at 163° C. of nothing as compared to 13.4, a per cent of total bitumen insoluble in 86° paraffine naphtha of 17.41 as against 14.99, and a per cent of fixed carbon of 11.20 as against 6.35. This oil could not be poured from the wooden barrels, and after knocking off the hoops both barrel and contents were thrown into small heating kettles, where the oil was heated to about 350°



TREATED WITH LIQUID ASPHALT

F., when the staves floated to the top and were used as fuel. The surface of this section was not painted. Stone chips were applied and rolled in, making a smooth, firm surface which was in good condition last winter.

The above description refers to about 200 feet of this section, which by mistake was laid with an oil from the same manufacturer, but intended for use by the mixing method, and only 90 feet was laid with that furnished for the penetration method, but there was no apparent difference in the results obtained from the two products. That intended for the penetration method showed penetration under 100 grams at 196° as against 247° for the other; it also contained about one-sixth more total bitumen and a little more fixed carbon.

Experiment No. 7 was the same as No. 6 except that refined water gas tar was used instead of oil. This material was first warmed in the barrels, then poured into the kettles or tank and warmed to 275° C. The material had a specific gravity of 1.158, and 1.15 per cent of free carbon. The tar-coated course, after stone chips had been applied, was rolled down into good condition. On part of the section more tar was applied than had been intended and the surface did not require a paint coat, but on the contrary a large amount of stone screenings was found necessary to take up the surplus tar.

In experiment No. 8 a viscous semi-asphaltic oil was used in the same manner as in experiment No. 5. This oil had a specific gravity of 0.993, 12.7 per cent of total bitumen insoluble in 86° paraffine naphtha and 9.45 per cent of fixed carbon. It was applied at the rate of 2 gallons per square yard at the request of the manufacturer's agent. This proved to be too much and the oil sweated to the surface upon rolling and it will undoubtedly be necessary to apply stone screenings from time to time until all excess of oil is taken up.

In experiment No. 9 the top 4 inches were composed of open-hearth slag with dimensions between $\frac{3}{4}$ inch and 3 inches, spread and rolled until firm. About 1 inch of $\frac{3}{4}$ -inch to $\frac{1}{4}$ -inch crushed slag was then spread evenly over the surface and rolled. A heavy refined water gas tar was then poured over the surface in the usual manner. This tar had a specific gravity of 1.167 and contained 2.09 per cent of free carbon and 67.5 per cent of hard, brittle and lustrous pitch residue. It was of such consistency that it had to be handled in the same way as the oil used in experiment No. 6. Fine slag, from $\frac{1}{4}$ inch to dust size, was rolled into the tarred surface. This made a smooth, firm road. After it had been completed, mud was found coming through the surface in one place where the foundation was soft. About two square yards of this surface was taken out and the mud was replaced with good gravel well tamped, and the place patched with the same kind of material.

In experiment No. 10 the stone was laid to the same depth as in No. 1, but the bonding material was Kentucky rock asphalt, which contained 93.27 per cent of mineral matter and 6.73 per cent soluble in CS_2 . Seventy-eight per cent of the material passed the 30-mesh sieve, but was retained on the 80. The extracted bitumen had a specific gravity of 1.027, contained 18.10 per cent of bitumen insoluble in 86° paraffine naphtha, and 10.83 per cent of fixed carbon. Before spreading this, the upper course of stone was rolled until firm. On half of the section the rock asphalt was spread to a depth of $1\frac{1}{2}$ inches. On the other half $\frac{1}{2}$ inch was first applied and a harrow passed over it to work it into the stone, after which the course was rolled at once to smooth up the surface and rock asphalt was again applied to a depth of one inch. The $1\frac{1}{2}$ inches of asphalt was also harrowed in the same way. The whole surface was then rolled. During a cold spell of 10 days intervening, it was found impossible to finish this surface satisfactorily, since it tended to crack under the roller; but when the weather became warmer it was finished off in good condition. When rolling it was found necessary to cover the roller wheels with dust to prevent the asphalt from picking up. During the first week after laying the road showed signs of caking, but when visited during the winter was in excellent condition and showed no such signs. No difference could be seen between the two halves.

The length of this section was 300 feet and the area 533 square yards; 111 cubic yards of No. 2 stone were used per square yard and 0.041 cubic yards of rock asphalt. The cost of the stone was 14.55 cents per square yard and that of the rock asphalt 31.08. Hauling and labor brought the total cost up to 83.04 cents per square yard.

Experiment No. 11 was the same as No. 9, except that 10 bituminous material was employed, slag screenings from $\frac{1}{4}$ inch to dust being used for a binder. Owing to its hardness and the lack of very fine material or slag powder and to a rather soft subgrade, it was found impossible to obtain a good bond. The fine slag was gritty and sand-like and would not pulverize under the roller to furnish the very fine dust necessary to give satisfactory results. To remedy this, unslaked lime was spread over the surface and rolled in as in the Youngstown experiments. The surface was well watered, but did not show up as well as the slag roads at Youngstown.

The length of this section was 200 feet and the area 365 yards. Each square yard required 0.139 cubic yards of No. 2 stone, 0.022 cubic yards of screenings and 3.3 pounds of lime. The cost per square yard of the slag was 30.28, of the screenings 4.83 and of the lime 2.26 cents per square yard; the total cost being 49.56 cents.

In experiment No. 12a the foundation consisted of crushed limestone 2 to 4 inches in size laid 4 inches deep. The wearing course was composed of concrete made of one part Portland cement, 2 parts sand and 5 parts stone. The sand used was a fine, clean product. The stone was of the kind used in other sections, the larger size ranging from $1\frac{1}{4}$ to $2\frac{1}{4}$ inches and the smaller from $\frac{1}{2}$ to $1\frac{1}{4}$. Various proportions of the two sizes were experimented with to determine which gave the maximum density, and it was found that this was obtained with $3\frac{3}{4}$ parts of the larger to $2\frac{1}{4}$ parts of the smaller stone. These proportions were followed as nearly as possible in carrying out the work. The concrete was mixed in the McKelvey mixer, hauled 300 feet and dumped upon a mixing board, from which it was shoveled into place and raked with steel hand rakes to conform to the desired surface of the road. The mixture was raked and tamped until the mortar flushed to the surface, and the surface was then rolled until fairly smooth with a concrete roller $2\frac{1}{2}$ feet long by 18 inches in diameter. The finished surface, while somewhat rough, was uniform except where the mixture was made too dry. The finished surface was immediately covered with leaves to protect it from frost. From the time the material went into the mixture until it was covered up averaged 40 minutes. The first 30 feet of this section (experiment No. 12b) was coated with the artificial oil asphalt described in experiment No. 4. This material was applied hot at the rate of one gallon per square yard and was covered with stone chips. The bitumen did not adhere very well to the cold, damp surface. After the concrete had been laid the road was kept closed for about 15 days.

In experiment No. 13 the foundation was constructed in the same manner as No. 4. At the request of the university a concrete composed of six parts of ashes from the college heating plant, two parts of sand and one part cement was prepared and laid as in experiment No. 12. Upon setting the road became hard and appeared quite satisfactory.

Experiment No. 14, with brick pavement, included a macadam foundation, 2-inch sand cushion and cement grout filler. The bricks were furnished by six different manufacturers. The general construction was in accordance with the specifications and methods recommended by the National Paving Brick Manufacturers Association. The road was closed to traffic for 10 days, not even the street cars being allowed to pass during that time.

The length of this section was 306 feet and the area 526 square yards. There was used per square yard 0.056 cubic yard of sand cushion and an average of 40 bricks. The bituminous filler which was used along each curb cost 3.75 cents per running foot. As the labor used in this work was inexperienced the prices were very high and it does not seem necessary to give them.

HARRISBURG WATER WORKS

Fire Hydrants—Water Meters—Operation of Filters—Bacterial Efficiency of Plant—Sand Analyses—
Income and Expenditures

ONE of the most informative water works reports which we receive is that from the Harrisburg, Pa., municipal plant. The report for 1909 contains complete information concerning the various improvements and operation of the plant during that year. In connection with fire protection the department believes in plenty of fire hydrants, spacing these at the rate of 13 or more per mile of distribution main, Superintendent George G. Kennedy believing that "the frequency with which hydrants are located in this city it is believed is exceeded by very few towns, if any. The advantage of having them placed so close is in saving of hose and cutting down the pressure ordinarily due to friction in long fire lines." All hydrants used in fire service are carefully inspected after the water has been turned off by the firemen at the conclusion of a fire, and are replaced in good condition at once if any repairs are needed. All hydrants are inspected and flushed in the spring, usually in April, and again in the fall, usually in November. At these inspections the condition of each hydrant and its surroundings are noted and repairs are promptly made where needed.

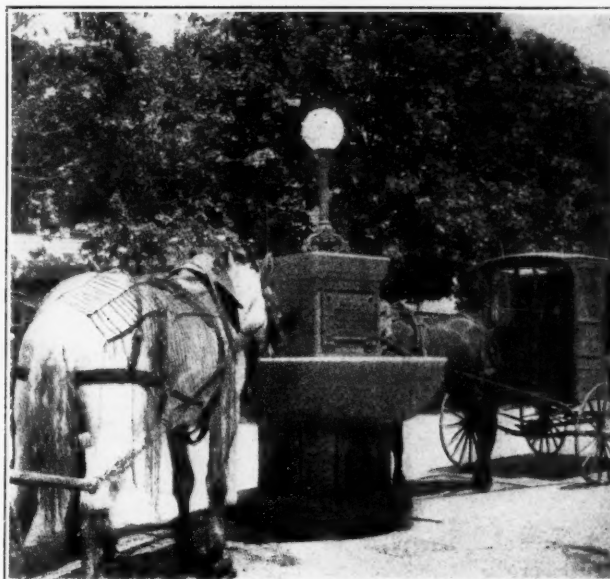
An improvement made last year at the reservoir was the placing of a No. 4 mesh wire netting four feet high around the entire reservoir inside of the fence, the object being to exclude toads and frogs. During the summer of 1908 frog spawn and pollywogs were found in the water in objectionable quantities, but the netting apparently served its purpose, and no trouble of this kind was experienced in 1909.

The commissioners believe in water meters, and by the end of last year 78.8 per cent of the taps were metered. Concerning this they state in their annual report: "The convenience offered by the use of bath tubs, sanitation, toilet and other appliances placed where wanted, is appreciated. The fact that such openings and appliances are not charged for at so much per fixture, but that instead the charge is based on the water used, has encouraged the installation of these fixtures and allowed persons of limited income to enjoy what was formerly practically prohibitive by reason of the old method of charging for the fixtures. When it is considered that over 60,000 houses in the city, most of them fitted with improved water fixtures, get water for \$6.00 a year, and that the average revenue from all metered houses is but a little over \$8.00, it can be readily seen why consumers prefer to buy water by meter measurement."

The department decided to remove, clean and test all meters, commencing with those longest in service, and to study the data thus obtained, with an idea of deciding upon a general plan for systematically testing meters at such times as they would probably require it. During 1909 1,970 meters were removed, 1,712 were cleaned and tested and new parts put in those which needed them. Of this number 76 were sent to the factory, but the balance were repaired at the meter repair shop of the de-

partment. Very little or no repairs were required to cause 916 of the meters to register correctly, and no charges were made for their removal, cleaning, testing and resetting. The remaining 796 needed considerable attention, and charges for these averaged \$1.85 per meter, or 86 cts. per meter removed, or 16 cts. per meter in use. "The cleaning and testing of the meters so far has not developed, to any decided extent, the advantage of any particular style or type, but it does show that, considering the lack of attention they receive and the abuses they are subject to, they are a fairly accurate and durable machine. Of the meters set twenty years ago and not removed in that time a fair percentage registered accurately and needed no attention other than cleaning."

At the filtration plant the same general method of operating



FOUNTAIN PRESENTED BY NATIONAL HUMANE ALLIANCE

was continued as in previous years. In washing, air is first given to the filters for something less than four minutes, followed by water for an average of almost five minutes at a vertical rate of nine inches per minute, the time varying from three to six minutes, according to the turbidity of the water. The filters are not washed quite clean, and are not allowed to run to a high loss of head. This shortens the run a little at each end, the object being to obtain more uniform results throughout the run. This result seems to have been obtained, but the number of washings has consequently been increased and the percentage of wash water used has increased from 2.6 to 2.9. No addition has been made to the filtering sand since the plant was put in service, and measurements show that a very small amount of sand has been lost in any of the filters in the four years' service.

On 47 days during the year the alkalinity of the river water was insufficient to decompose all the sulphate of alumina, and soda ash was added to prevent the appearance of alum in the effluent. A complete chemical analysis of the raw and of the filtered water is made each week, and a mineral analysis occasionally. Prof. James M. Caird is retained by the department as consulting chemist and bacteriologist, and keeps in touch with the operation of the plant. In his report made in January of this year he gave in detail the results obtained at the plant, the general totals and averages of which were as follows: The bacterial efficiency of the settling basin in 1906 was 73.91 per cent, and in 1909 80.87 per cent. The efficiency of the filters was 97.06 per cent in 1906 and 98.28 per cent in 1909. The combined bacterial efficiency of the plant was 99.24 per cent in 1906, 99.59 in 1907, 99.62 in 1908 and 99.68 in 1909. The river water contained an average turbidity last year of 42 parts per million, a maximum of 1,000 and a minimum of 2, all of which was removed by the plant. The color of the crude water averaged 12 parts per million, with a maximum of 36 and a minimum of



PIPE SHOP AND YARD, HARRISBURG WATER WORKS

3. The filtered water has been free from color at all times. The alkalinity of the river water averaged 40 parts per million, with a maximum of 105 and a minimum of 7 parts. As stated above, when the alkalinity was insufficient to decompose the required amount of sulphate of alumina, soda ash was added. Bacteria in the crude water averaged 8,448 per c.c., with a maximum of 117,475 and a minimum of 108. Of 441 tests for coli communis, 262 gave positive presumptive results, 1 c.c. samples being used. In the filtered water the average number of bacteria was 17, the maximum 628 and the minimum 1, and of 1,760 tests for coli communis 19, or 1.07 per cent, were positive. The number of bacteria per c.c. averaged less than 100 on 347 days out of the year, and on 312 days averaged less than 21.

Says Mr. Caird: "In most filter plants very little attention is given to the condition of the sand in the filters. In order to get the best results the sand should be examined as to size, etc., for in washing the filters, if care is not used, the finer grains will be washed out, the beds will become too coarse and poor results will follow. During the year the sand from all of the filters was examined, the average being effective size .33, while the uniformity coefficient was 1.73. It was found that 60 per cent of the sand was finer than .58 m.m., while over 67 per cent of the sand was finer than .60 m.m." An analysis of the sand showed that about 99½ per cent of it was silica. Such particles as were over 1.25 m.m. in diameter were found to consist of coal, which had probably been introduced by the water being filtered.

The expense of maintenance and operation of the filter plant during the year was \$19,167.07, or a cost of \$5.24 per million gallons. Sinking fund and interest demands amounted to \$5.78 per million gallons, making a total of \$11.02 per million gallons delivered to the pump. The cost of operation was divided as follows: Coagulant, \$5,033.74; coal, \$1,856.21; oil and waste, \$312.60; supplies, \$1,174.99; repairs, \$1,039.72; lubricants, \$1,547.09, and wages, \$8,229.72.

The expenses at the pumping station per million gallons were: Coal, \$1.38; supplies, 36 cts.; repairs, 31 cts.; oil and waste, 20 cts.; reservoir, 43 cts., and labor, \$1.83; a total of \$4.51. The total cost per million gallons consisted of \$5.24 filter plant expenses, \$4.51 pumping station expenses, \$2.09 for street mains, \$1.62 for office and inspection, \$10.90 for sinking fund, 76 cts. state tax and \$8.25 interest charges; a total cost per million gallons of \$33.37. The cost in 1908 was \$38.37, the reduction being due principally to the greater amount of water pumped and to greater care in operation.



THE JACOB R. EBY MEMORIAL
FOUNTAIN

The daily per capita consumption was 143 gallons, of which 78 were used by the mills and factories and 65 by residences, for public purposes and all other requirements and losses. The receipts from yearly water rents were \$29,570.53; those from metered domestic supplies, \$98,543.42; from metered manufacturing consumption, \$56,898.88, and from other sources, \$4,170.26. The value of the water and service supplied to the city without charge was \$35,489.49, and that furnished churches, charitable and public institutions was \$3,676.56. This shows the value assigned to the water furnished free to have been about 21 per cent of the total value of all water furnished. Of the amount of water furnished free, \$773.50 was for the fire department, \$17.51 for city buildings, \$3,602.73 for county buildings, \$2,360.91 for public institutions, \$4,648.75 for public fountains and \$1,315.65 for churches. The drinking fountains were charged for at annual rates rather than by meter, and the fire hydrants were charged for at the rate of \$30.00 a hydrant. No charge is

made for water used in street sprinkling, and we presume that is included in the charge of \$26,505 for fire hydrants. Also nothing is said concerning water used for flushing sewers, and there were probably other public services rendered which are not included in the statement.

SEWAGE FUNGUS AND PURIFICATION

Vegetable Organisms Thrive on Nitrates—Character of Fungus
an Index of Purification of Effluent—Study of
This Urged on Superintendents

Abstract of a paper by Gilbert J. Fowler before the Leeds Sanitary Congress.

WHERE the mineralization of organic matter in sewage has occurred by land treatment the nitrates and nitrites are usefully absorbed, but in the majority of purification plants they pass into streams with the effluent. Unless the dilution of such effluents is very considerable this oxidized organic matter is capable of causing considerable growths of vegetation which may become nuisances either by their abundance or by their later putrefaction. The effluent from the Withington works at Manchester, England, is non-putrefactive, but furnishes food for considerable quantities of *carchesium*, beautiful organisms with bell-shaped heads on delicate thread-like stems. When living this is unobjectionable, but the rotting of masses of it is capable of producing a distinct nuisance. This organism has also been found at the base of a secondary percolating filter at Davyhulme dealing with the effluent from primary contact beds. This effluent is clear and bright, non-putrescible, and practically saturated with dissolved oxygen. Nitrification is well advanced, yet considerable development of *carchesium* takes place in the outlet channel, with simultaneous diminution of the dissolved oxygen content. Apparently, this particular organism can grow in effluents which would be passed as satisfactory from a chemical point of view.

The production of green growths, consisting, as a rule, of *oscillatoria nigra*, a green chlorophyllous alga, is generally considered evidence of satisfactory purification; but the influence of sunlight appears to determine to some extent whether this or *carchesium* shall grow in the effluent.

Where purification is not carried so far, and especially where small proportions of unpurified sewage are mixed with it, other organisms develop whose decomposition may be even more offensive. Below the outfall of the Gorton plant of the Manchester disposal works masses of *beggiatoa*, or sulphur fungus, were found and measures have recently been taken for its removal by sterilization of the effluent, the greater part of which consists of a tank effluent from chemical precipitation. The rate of development of fungus in this effluent was extraordinary. A wooden shoot nearly 50 yards long was covered with a well-defined growth in two days. This was completely arrested by the addition of chloride of lime at the rate of 3 grams per gallon.

The production of fungoid growths is a very sensitive index of pollution and it is possible to differentiate between varying sources of pollution by the character of growth developed. This was pointed out years ago by Santo Crimp, but it is doubtful whether the subject has received as much attention as it deserves. It is well known that small leakages of unpurified sewage passing direct into the sub-drains of irrigation areas may produce disproportionately large amounts of fungus, the species depending upon circumstances. The growth of fungus in sub-drains may depend also on the character of the land and of the effluent applied to it. If, for example, iron is present in the latter there is a great liability to the development of *crenothrix*, a filamentous organism which collects large masses of hydrated oxide of iron around it. The effluent from the Birmingham sewage farm has to be screened before passing to the river in order to remove particles of this fungus from it.

There are, of course, countless other flora and fauna which

are characteristic of different stages of purification. The scientific biologist would be considerably assisted in the study of these if those in charge of sewage works would keep systematic records of the more characteristic developments occurring under specific conditions, such as composition of sewage, time of year, temperature, etc. Thus, for example, it is probable that dilution of the sewage will affect the question of growth owing to the greater ease of osmosis. The development of fungus in the Withington sewage, previously referred to, is probably due to the exceptional dilution of such sewage.

These growths may be temporarily arrested, of course, by sterilization, but such a process is costly and open to objection because of its possibly deleterious effect on the normal life of streams. On the other hand, there can be no doubt that many fungoid growths form excellent habitats for larvæ, small worms and probably numerous forms of crustacea. The development of gnat larvæ is a matter of rather serious moment, which has been carefully watched. In connection with the effluent from the percolating filter at Davyhulme, gnats appear at certain periods of the year in objectionable numbers at the manhole covers of the closed channel through which the effluent passes. These forms of life, however, may constitute excellent food for fish, and at the Berlin sewage fields large ponds have been constructed into which the final effluent flows, and in which carp and other coarse fish attain large sizes.

It is now generally recognized that the provision of some kind of tank to arrest deposits from percolating filters is necessary, and the Royal Commission suggests a similar provision in the case of contact beds. It is worth consideration whether this idea might not be developed, and such tanks extended to form aquariums. Careful management would be necessary in order, by the growth of aquatic plants or otherwise, to maintain an adequate supply of dissolved oxygen. It is probable that considerable diminution in the bacterial content of effluents would result from such storage. The cost might be partly met by the value of the fish produced, and in any event the complete cycle from offensive organic matter through mineral matter and back again to organized life would be under control, instead of allowing the effluent to pass directly into the stream with all the possible contingencies which may arise.

STREET TREES

MR. GEO. A. PARKER, who, as stated in these columns a few weeks ago, has been appointed city forester and is also superintendent of parks of Hartford, Conn., has reported to Superintendent of Streets Frederick L. Ford of that city, in reply to certain questions, giving some opinions concerning planting and care of street trees in that city. As to the cost of growing, fertilizing and planting suitable street trees and protecting them with tree guards, he states that the cost would be not less on the average than \$5.00 per tree if done in what is now considered to be the best way, although it probably could be done for \$1.00 per tree by the cheapest and quickest known method, which would not probably be productive of as good results.

As to whether it is best to use the same species of trees on each street in its entirety, or to change the variety at frequent intervals, he replied, "Generally speaking, it usually is considered best to plant a street, if not too long, or too varied in its uses, with the same kind of tree; especially is this true if the building line is near the property line. Where there is space enough between the property line and the face of the house to give somewhat of a grove effect, then the trees may, without offence, be varied." Concerning the location of shade trees he states, "Where the building line is close to the property line it is necessary to plant next to the curb in order to gain root space. Unless there were special reasons for doing otherwise, I would generally plant about one foot inside of the property line."

Concerning the trimming of trees where they and overhead wires interfere with each other he replies, "I believe it is the better policy for the street department to take the entire charge

of trimming street trees and their care, and that the work should not be done by employees of the overhead wire corporations, except in emergencies. I believe that the cost of trimming trees should be paid for partly by the street department, partly by the overhead wire corporations and partly by the abutting owners. I believe that the war hitherto carried on between those interested in trees and those interested in overhead wires should cease, for there is no just cause for it, and that it will cease as soon as this matter has been well thought out and presented to the public."

A LITTLE BITUMINOUS FILLER STORY

By E. A. KINGSLEY, City Engineer, Little Rock, Ark.

THREE years ago the Department of Public Works of Little Rock, Ark., decided to make an attempt to avoid the unsightly, wide transverse expansion joint in brick paved streets and to provide, at the same time, for more expansion. We confess we were prejudiced against bituminous fillers and in favor of cement grout. But we have always favored plenty of expansion joints to counteract the cement grout.

On a little district which was being paved by subscription and upon which not enough money could be raised to do a first-class piece of work the experiment was tried. In the first place, the bricks were not high grade. They would not stand the National Brick Manufacturers' rattler tests nor would they stand the absorption test. But they were purchased at a very low figure and we expected the grouting to do the rest.

The pavement was laid in a four-inch concrete foundation, and under the usual specifications. A first-class job of work was done by the contractor and his cement grout was as well done as is usual on the ordinary brick job.

For the transverse expansion joint, however, we spaced our brick to give one and one-half inches for every one hundred feet in length of street. This made a pretty wide expansion joint, but this amount was deemed necessary on account of the quality of the brick.

The 1½-inch strips were placed in the street as the bricks were laid, but before pouring the hot filler into this wide joint the three rows of brick either side of the strip were moved inward, after the strip was removed, making seven narrow joints to be filled instead of one wide one.

This method has proven a success. It has allowed plenty of expansion and at the same time it has not left a wide unsightly joint for the bituminous material to expand and contract in, leaving the edges of the border brick unprotected.

But the most valuable lesson taught has been the protection which a bituminous filler affords the brick. The grout filler was well applied and was of good consistency. But, as stated, the bricks were not "number ones." Consequently there has been an excessive abrasion due to the heavy traffic carried by this small section of street. After three years, the bricks which were filled with grout have worn down very considerably, brick and grout together, leaving, however, a fairly smooth street. But every 100 feet there is a slight ridge in the street from curb to curb. Where the brick had been spread and the bituminous filler used, the bricks are in almost as good condition as when they were laid, showing very little wear due to the three years' traffic.

A short time since, the writer had the privilege of showing representatives of two large bituminous filler concerns over this work and both were astonished (and of course elated) at what they saw. And, strong as our prejudice was against bituminous filler, we must confess that we have seen with our own eyes that where a cement grout has failed to save a soft brick used for paving purposes, the bituminous filler has, during three years' constant wear, so protected the same brick, under the same conditions, that it shows practically no wear. It has been to us an interesting and valuable lesson and we have watched it carefully for a long time. It is given to our fellow engineers now after three years' test that they may, if they choose, profit by our own experience as we are doing from time to time from experiences of others.

AGRICULTURAL USE OF SEWAGE

Rendered Difficult by Water Carriage System—Irrigation Unfavorable to Utilization of Nitrogen by Plants—Fertilizer from Sludge.

THE use of sewage as a fertilizer, either in its liquid form or as sludge, has been discussed and experimented with for years. In a paper before the Association of Managers of Sewage Disposal Works (England) in July, Mr. J. A. Voelcker, consulting chemist of the Royal Agricultural Society of England, stated his conclusions on the subject as derived from the latest information available concerning sewage disposal. He considered the chemistry of the various ingredients of sewage to which fertilizing value has been attributed, and then, referring to the practical use of them, continued as follows:

It is clear that if the practice adopted in China and in many parts of India, of collecting the excreta daily and depositing them direct in the soil, were followed universally, there would be the minimum of loss and the greatest profitable return in the subsequent growing of crops. But such procedure is nowadays out of the question in this country, and even the use of the earth-closet system is so little practicable that it does not enter seriously into consideration. All such systems as these have had to go "by the board" in favor of the water-carriage system, and it is this alone which we need here treat of. At the same time there is no question but that where the pail system is still in operation there will be the best return in an agricultural direction. Such a system, however, is quite incapable of dealing with trade and manufacturing refuse. Whatever the agricultural benefits arising from the use of sewage may be, these have had necessarily to give way to the claims of the speedy transmission of objectionable matter from closely-populated areas. This has brought about a new set of circumstances which have seriously interfered with the realizing of any value from the use of sewage in an agricultural direction. How this affects the question it will be for us now to consider.

The main difficulty is with regard to the water, this constituting by far the largest factor in sewage. The first effect of the water is to enormously dilute the constituents which possess fertilizing value. So marked is this that it may be said that the total amount of nitrogen in the sewage of water-closet towns does not on an average exceed 2.2 parts per 100,000, or .0022 per cent. As the amounts of phosphoric acid and potash yielded from excreta are even less than the nitrogen they would not amount to, on an average, more than .0013 per cent of phosphoric acid and .0009 per cent of potash. The passage of so much liquid, presuming the sewage to be poured over the land in a crude untreated state, would, in most cases, necessarily mean the passage through the soil of a large proportion of the soluble constituents which the soil would be unable to retain and which would be lost in the drainage water.

To what extent this loss would proceed would depend, of course, on the nature of the soil, and on the area of land available for irrigation purposes; but it is seldom in practice that the area is sufficient to allow of the dealing on it of the sewage in such a way as to secure the maximum benefit and the least loss. The nitrogen in raw sewage, as we have seen, is seldom in the form of nitrates (that in which it can be freely taken up by plants), but requires to be converted into nitrates by nitrification. This latter process depends for its successful working on various conditions being present. Chief among these are a suitable temperature, abundant aeration, and the presence of some base such as lime.

Land on which sewage is being constantly poured has a marked tendency to become cold, and aeration is much impeded when the land is in a state of saturation. The circumstances, therefore, are not favorable to nitrification proceeding freely whenever the soil is, as generally happens, taxed to its utmost to deal with the liquid poured on its surface. Nitrification, at the best, only goes on in the first 16 in. or so of soil, and even in the case of land which has been at rest and where

nitrates may have formed, the inflow of large volumes of water will have the effect of washing out a good deal of the nitrates so formed. Thus it is that nitrates form comparatively so large a proportion of the constituents of drainage water from irrigated lands. Again, nitrification is very little active during the winter months, and crops are but little able to avail themselves at this period of the nitrogenous matters contained in sewage. When no crops are growing on the ground the soil becomes little more than a filtering medium, and it is only a small proportion of the fertilizing constituents that can be retained by it. In the case of a soil that is at all waterlogged, denitrification rather than nitrification is likely to result.

When, however, crops are being grown on the land, and the conditions are kept reasonably favorable for their culture, the losses are less and the return more marked. But here, again, care has to be exercised in regard to the kinds of crops grown, and it is essentially those of succulent nature, such as mangolds, cabbage, prickly comfrey and rye grass, which should be employed. Such crops, by their rapid nature of growth and the avidity with which they take up soluble constituents supplied to them, are well suited for the purpose, though, in respect of quality and feeding value, they will fall below those cultivated on dry land. Out of the large quantity of food constituents supplied, some quantity, however, will be taken up by the quickly-growing crops, and this is the best means of utilizing them. Much the same applies to sewage when poured over grass land, the abundant rooting of the grasses helping to retain the constituents much more completely than is the case with arable land. On the other hand, inasmuch as the grass only makes a start to grow in the spring, it is from this time only that the benefit is really shown, though no doubt fertility is being built up in the soil at other periods, and the losses by drainage are not so great.

Where sewage is poured untreated over the land a further difficulty is met with in the tendency of the fatty and soapy matters carried down with it to collect together and form an impervious scum on the surface. When this occurs it is fatal to successful cultivation and the only remedy is to give the land a rest and to break up or remove the scum. If such scum be formed, not only is the further passage of the liquid through the soil prevented, and clogging of the land results, but aeration is entirely stopped and nitrification brought to a close. The same effect would be produced by the continual pouring on the land of brewery waste, and the like. Some sewages, more particularly those in which the waste from the manufacturing processes forms a considerable proportion, are decidedly acid in nature, and when this occurs a state of affairs unfavorable to bacterial changes going on in the soil is produced. Also, where chemical agents have been used as precipitants, materials are frequently brought on the land which are in no way beneficial from an agricultural point of view. Their presence, further, retards the desirable decomposition of the different organic and nitrogenous matters brought on to the land.

Soils vary considerably in regard to their suitability for dealing with sewage poured on to them, and, while some, such as heavy clays and peaty land, are quite unsuitable for irrigation purposes, others, such as rich loams, may be well adapted thereto and sandy loams and even sands be capable of successful utilization. The last named, however, will not so readily retain the constituents of the sewage, nor bear such good crops, but act rather as filtering media. In treating land in this way, the ideal is to allow intervals for aeration and oxidation, and so avoid stagnation and the stoppage of the natural processes going on in the soil.

The difficulties connected with the clogging of land when crude sewage is turned on to it have mainly resulted in the adoption of processes of chemical treatment with the object of removing the suspended matters and those capable of precipitation which are contained in sewage. From an agricultural point of view, however, the value of the sewage is thereby considerably reduced, inasmuch as the phosphates are, to a large extent, removed, as also are the nitrogenous bodies such as proteins; the amides and ammonium salts, however, pass on in

the liquid portion. There is then left the difficulty of dealing with the solid matters, or "sludge," as it is called, and this constitutes a real difficulty. It has been sought to be got rid of by various ways, including the digging of the solid matters into the ground, or the pressing of them with lime into cakes and allowing these to dry for subsequent breaking up and use as manure. None of these methods, however, have been really successful. The wet sludge when dug into the ground remains long unaltered and blocks the soil, rendering drainage difficult and cultivation unsatisfactory. The accumulation of sludge further constitutes a source of nuisance and possible danger, inasmuch as bacteria are found to be far more abundant in the sludge than in the liquid sewage, and to increase largely at the ordinary temperature of the air. Later on the trouble in dealing with sludge was to some extent minimized by the adoption of the "septic tank" system, but even this does not succeed in getting rid of the sludge entirely, and the best process with which I am acquainted is that introduced by Mr. Dibdin, and known as the "slate bed system," whereby the sludge is reduced almost to a minimum, and, by reason of the bacterial changes which it is made to undergo, is converted into a harmless and almost inodorous material, the disposal of which, owing to its character and the very small amount of it that is produced even under continuous working of the beds, presents no difficulty.

MANURIAL VALUE OF SEWAGE IN ITS DIFFERENT FORMS.

From what has been already said, it may be gathered that, in my opinion, the manurial value of sewage as it is now generally met with, and whether it be in the form of crude sewage, of sewage deprived of its solid matters, or of sewage sludge, is but very small. Theoretically, it may be rightly said that great loss to the country is being incurred by the letting run to waste of material representing so large a proportion of the food consumed by human beings, and which ought to be returned to the land and come back again in the form of crops. More especially is this urged when one considers the high prices paid for fertilizing materials, more especially nitrogen, at the present time, and in view of the forebodings that have been expressed as to the failure, in the near future, of our nitrogenous supplies. But these theoretical considerations have had to give way to the exigencies of modern-day life, and, despite the views that have been held in the past, and the many attempts to "make something out of" sewage, the last report of the Royal Commission on Sewage Disposal recognizes the fact, now established, that farming results with sewage have to hold quite a "secondary position." Quite recently, moreover, experiments have been carried out with sewage sludges, made by different processes, on actual crop growing, but with the result of showing that the manurial value of these has been very much exaggerated, and that even for the best of them, though carefully prepared and dried, 10s. a ton represents the full value. It had long been an article of belief, even among scientific men, that there was some "virtue" attributable to the use of materials of this nature, and containing so much organic matter capable of undergoing bacterial changes, which virtue was not to be represented merely by the contents of nitrogen, potash, phosphoric acid, etc., as expressed in analytical figures. These beliefs were not borne out by the experiments made, though these were conducted on a variety of crops and on different classes of soil, and though the experiments were continued for a second year, so as to give an opportunity of the effects telling at a later period, the sludge in no case did as well as did artificial manures containing practically like quantities of fertilizing ingredients. The striking point was, however, clearly brought out that the nitrogen in the forms in which it occurs in sewage sludge is not nearly so available as in artificial manures, and that richness in nitrogen is not a test of the comparative value of sludges. Nor, again, would freedom from moisture seem a desideratum; the sludges that answered best were those that contained the most lime, the most moisture, and the least nitrogen. Undoubtedly, on certain soils, such as those of heavy nature, and those poor in vegetable matter, sludge may effect a benefit from its mechanical action on the

soil and in improving its physical properties; but it is clear that its directly manurial benefits, as well as those of sewage itself, have been very considerably over-estimated.

REINFORCED CONCRETE WATER TANK

A REINFORCED concrete tank or reservoir was completed this spring by the city of New Ulm, Mich., and was described in a paper in the *Minnesota Enquirer* by Mr. H. F. Blomquist, city engineer of New Ulm, from which paper we abstract the following description.

The tank is 75 feet in diameter and 30 feet high and is covered with a conical concrete roof. Upon the foundation of hard clay soil was spread a layer of stone to an average thickness of 12 inches; the voids of which were filled with wet, fine grained concrete, poured in. On this was placed the floor part of the tank, which is 10 inches thick and is reinforced near the surface with expanded metal of No. 16 gauge thickness and 3-inch mesh. The floor and the walls are tied together by 1-inch round steel rods 8 feet long and bent at a right angle so that one-half the length is in the floor and one-half in the wall. These were spaced 12 inches apart measured along the circumference of the bottom. The walls are 20 inches thick at the bottom and 15 at the top, with a continuous batter on the outside. They are reinforced with 163 horizontal rods and 20 vertical steel angles used to support the same in position as well as serving as reinforcement. Of the horizontal rods 123 are 1½ inch in diameter and 40 are 1 inch. They are round steel rods rolled to the required radius and are calculated to be sufficient to take all the stress, thus leaving nothing for the tensile strength of the concrete or the support of the earth embankment on the outside.

The roof is of concrete 3 inches thick, which is reinforced with No. 12 gauge 3-inch mesh expanded metal; the reinforced concrete spanning the spaces between steel I beams which serve as purlins and are spaced 5 feet apart. These purlins are supported by eight steel trusses which radiate from a central pillar to the wall and are 6 feet high between cords at the end which rests upon the pillar, tapering down to 3 feet at the end which rests on the wall.

The forms for the walls were made in sections about 12 feet long by 2½ feet high, the inner and outer forms being bound together by ½-inch rods extending through the walls. These rods were removed after the concrete had acquired its initial set and the holes left were filled with strong cement mortar. Enough forms were used to make one ring of the reservoir, this ring being completely filled in one day's work, and the forms being removed and set up again during the following day. When the reservoir had reached such height that scaffolding was necessary, two days were required for removing and resetting the forms and extending the scaffolding.

Great care was taken to make the concrete water tight. Round pebbles varying from about ¼-inch to 2½ inches were believed to make a more impervious concrete than broken stone; and consequently pebbles carefully screened from a gravel bank were used, and a mixture of very coarse and ordinary fine sand was employed for the fine aggregate. In addition to these precautions 20 pounds of hydrated lime was added to every barrel of cement. After the forms were removed the walls were brushed and cleaned with steel brushes and two coats of cement plastering were applied on the inside, the mortar used consisting of one cement and 2 sand, 10 per cent of hydrated lime and 3 per cent of Medusa waterproofing compound being added to the cement. The walls and the upper 4 inches of the floor were made of concrete mixed 1:2:4. The bond between old and new concrete was made by brushing the old concrete until thoroughly cleaned and pouring on it a neat cement grout just before placing the new concrete.

Shortly after the reservoir was filled a small leak appeared in the bottom, due to an imperfect bond at this point between old and new concrete. This, however, was remedied without serious trouble; and aside from this the reservoir seemed to be tight.

BERLIN MUNICIPAL EXHIBITIONS

IN the latter part of 1909 the city of Berlin asked for competitive plans for a comprehensive street and building system to provide for future growth of the city. The foremost architects, artists and city experts of the country engaged in the competition and it was decided to give a public exhibition of their plans. As this seemed to afford an opportunity for a more extensive exhibition of city planning it was decided to make this international and plans, photographs and models from a number of countries were assembled in Berlin during the present spring. This exhibition was studied by visitors from England and continental countries, and a number of cities asked that the exhibits might be sent to them for exhibition purposes after the Berlin Exhibit had closed, and it was finally arranged that this should be done in the case of Düsseldorf, Antwerp and London. An illustration of the excellent manner in which many of the plans were worked out in the form of models is shown by the accompanying illustrations, one demonstrating what can be done in the way of developing large rear areas without the formation of unsanitary covered passages and close, dark courts. The other gives an idea of the model conditions aimed at by the English Garden Cities.

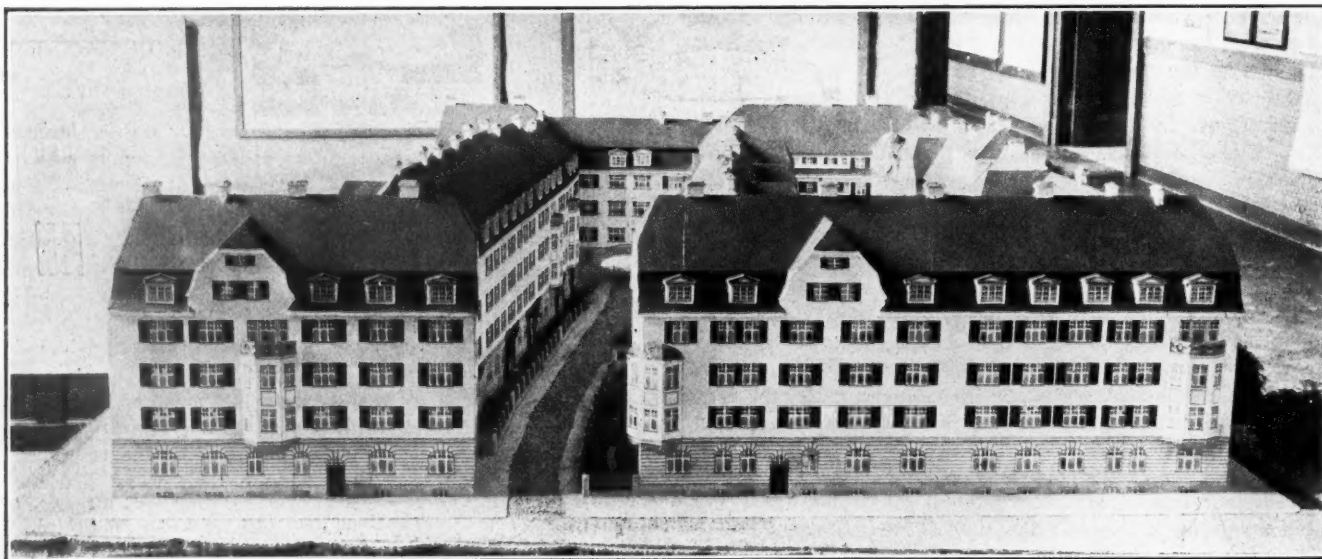
Germany undoubtedly leads in the scientific study of city housing, and England in the development of suburbs and garden cities, while the United States is admitted to surpass both in the development of parks.

IMPROVEMENTS IN MADRID

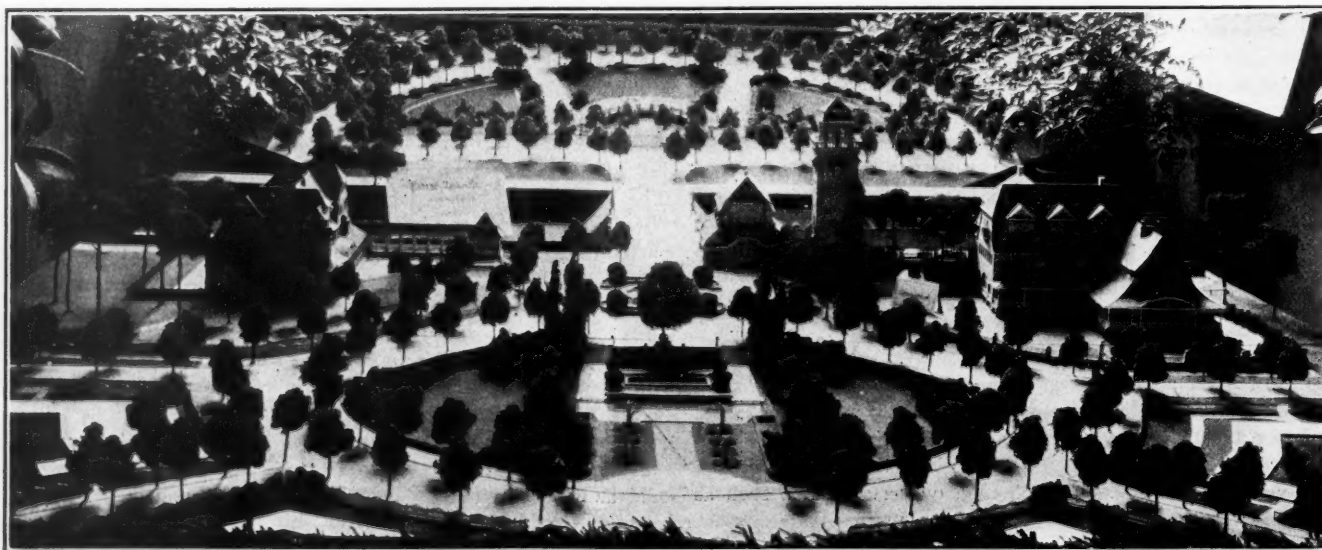
THE City Council of Madrid has begun work upon the new boulevard, to be called the "Grand Via," which has been projected for about twenty-five years. A syndicate composed of French and English capitalists secured the contract for its construction.

The new boulevard will be opened through the most congested part of the city and will connect the parks and boulevards of the northern and southern parts of the capital. The thoroughfare is to be divided into three sections, the first being 1,751 feet long and 82 feet wide, the second 1,342 feet long and 115 feet wide, the third 1,224 feet long and 82 feet wide. The 358 buildings, most of them six stories high, now standing in the course, will be razed, and 3,500 families and 500 business concerns occupying these houses will be forced to find new quarters. The period of construction is to extend over eight years, but the houses in the first section must all be razed by October 1, 1910.

This project is expected to stimulate business generally, as it will render necessary the construction of at least a sufficient number of houses to replace those which are to be torn down. Furthermore, the city is enjoying a healthy growth, and the modernization of its older parts is going on rapidly, and to an extent that is not realized by those who have not visited it recently. Hitherto Madrid has been a city without suburbs, but many "additions" are now springing up, in which modern houses are being built.



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Shade Trees and Overhead Wires

On another page will be found a few ideas concerning shade trees as stated by Mr. Geo. A. Parker, than whom there is, perhaps, no more experienced park superintendent in the country. The last paragraph of this seems to us especially worthy of notice. It is a common experience that companies maintaining overhead wires too often mutilate shade trees in trimming out the branches preliminary to running the wires or because they have been found to interfere with the same. In some cities this mutilation is allowed to take place without any official protest, although there are probably in every city a few citizens who take exception to this unnecessary disfigurement. Where any effort is made to prevent the companies from vandalism of this kind the officials are apt to go to the other extreme and abuse the companies for doing any trimming whatever, possibly even insisting that the wires must not be carried through the trees at all, but that some other location must be found for them.

There can be no dispute, and we believe there is none by the companies themselves, that the best place for wires is underground. It is out of the question, however, to insist that the companies go to the expense of underground conduits in the outlying streets of a city, or in fact in any of those occupied by more or less scattered residences, which streets are the very ones where shade trees are most abundant. Should the companies be compelled to go to such expense there can be no question but that they would be justified in increasing the rates for residence telephone service and electric lighting and also for street lighting and all other services calling for carrying wires through these streets. If the citizens, realizing this, are willing to pay such added rates for the privilege of having the wires underground we have no doubt that the companies would be very glad to make arrangements for accommodating them.

Given overhead wires, however, it seems not only necessary, but even desirable to carry these through the shade trees where these are tall or over them where they are still of small size, although in the latter case the increase in height of the tree with its growth would bring it in contact with the wires in time. Wires strung through the streets are generally recognized as eye-sores and objectionable from an æsthetic point of view, but where the poles are erected in line with the trees, they are concealed from sight more effectually than in any other location, and the wires carried through the foliage are well nigh invisible. If they can be placed in this position without any injury to the trees, such location would seem to be one to be desired rather than frowned upon. Wires can be strung through trees without interfering with any of the larger branches, and with few of the smaller ones if some care be taken. One object of the wire companies in trimming the trees is to avoid the abrasion of the insulation by contact with the branches; and conversely the branches themselves have their bark worn off and ultimately die because of the rubbing together of branch and wire. This can be avoided by protecting the large branches at the points where the wire would rub by nailing or screwing to them flat strips of oak or other hard and durable wood to receive the friction, and protecting the wire insulation by fastening around it rubber hose or some other guard at the points where contact is likely to occur. The guards for the branches should not be fastened on with wire or any other material passing around the branch, since this will cut into the branch as the latter increases in size and finally, cutting through the bark, result in the death of the branch beyond such point. With this friction of both wire and tree obviated and with occasional trimming out of the small branches in proximity to the wire, there need be little, if any, conflict of trees and wires with each other or of citizens and wire-stringing corporations.

Economy in Water Purification

RIGHT in line with our editorial of July 20th is a report made two days previous to the Mayor and Director of Public Works of Pittsburg, Pa., by Mr. Geo. A. Johnson, of the firm of Hering & Fuller. The citizens of Pittsburg have been much exercised by the fact that after spending a very large sum, even for Pittsburg, upon a water filtration plant they were informed that it would be necessary to spend about one million dollars more to provide sufficient capacity for the entire city. Mr. Johnson in his report states that this expenditure will be unnecessary, but can be avoided by the application of the latest developments in water purification to the operation of their plant.

The plant at present consists of sedimentation basins and slow sand filters. These apparently suffice except under conditions which occur at more or less frequent intervals, these including excess of suspended matter, of acids, and of bacteria. However, even neglecting these exceptions the plant as now operated would soon reach its limit of capacity. But Mr. Johnson recommends modifications which would permit of doubling the capacity of the present filters as now operated. To effect this he would "Provide facilities for the application of a coagulant to the river water at times when additional clarification beyond

that afforded by the present reservoirs is required for the advantageous operation of the filters." He would also, to further the same end, "Provide baffles in the present sedimentation reservoirs so as to secure a more complete displacement of the water during its passage through the reservoirs and thus secure more efficient sedimentation." To meet any abnormal number of bacteria or any failure of the filters to sufficiently reduce the bacterial content, he would considerably extend and systematize the hypochlorite treatment which is at present being used at the plant "so that the hygienic quality of the filtered water delivered to the consumers will be satisfactorily maintained, regardless of the rate of filtration."

With these provisions for rendering possible a high rate of filtration and taking care of any deficiency in bacterial reduction due thereto, he recommends an increased rate of filtration; and in order to increase the average rate he would "Put the filters into service at full normal rate immediately after cleaning" and "reduce to a minimum the frequency of scraping the filters and take full advantage of other means of relieving clogging, especially by raking the sand surfaces or by using the Brooklyn method of cleaning, or a combination of the two." Incidentally, he would investigate the present excessive cost of handling the sand. For correcting iron and acid conditions in the river which are due to mine drainage he does not at present offer any definite remedy, but apparently believes that such a one can undoubtedly be found (probably by the introduction of some harmless chemical). This and other details will be described at greater length in a more complete report, of which this was merely a preliminary.

This certainly is a striking illustration of the saving which can be effected, to say nothing of the increased efficiency which will probably result by taking advantage of the latest advances in knowledge and skill in the art and science of water purification.

ROAD CONSTRUCTION TERMINOLOGY

Editor MUNICIPAL JOURNAL AND ENGINEER,
239 West 39th Street, New York.

DEAR SIR.—Perhaps I may add some thoughts of value to the interesting and valuable discussion of your issues of June 15 and 29 on this important subject.

There certainly should be less confusion of terms, whether from commercial reasons of manufacturers too often practised, or from looseness of use of terms.

BITUMINOUS "DUST LAYERS," "BITUMINOUS BINDERS" AND "BITUMINOUS CEMENTS"

These are distinctly different classes of bituminous material varying from a soft oily consistency to a material stiff enough to have a "cementing" or "binding" strength. Although these terms have been used only a few years, they are already used indiscriminately, loosely and without regard to their "dust-laying," "binding" or "cementing" properties. Thus we find manufacturers of liquid road oils and emulsions and even engineers naming these materials and referring to them as "bituminous binders," notwithstanding they have little more "cementing" or "binding" properties than water and are "dust layers" pure and simple.

To be a true "dust layer" the bituminous material must be liquid or oily and thus of a character which will readily absorb and hold the road dust in suspension. Such a material has comparatively no cementing or binding strength and should be called "road oil" or "bituminous dust layer" and never "bituminous binder" or "bituminous cement."

The writer can see no proper distinction between "bituminous binder" and "bituminous cement." The names imply that the materials to which they are applied have the property of strongly "binding" or "cementing" together the mineral aggregates used in the road construction.

A true "bituminous binder" or "bituminous cement" is necessarily a material which is rather hard or stiff at normal temperatures and not too brittle at cold temperatures. This is because the cementing strength of bitumen is based on its normal hardness, viscosity, ductility, cohesion and adhesion. Bituminous cements are not at all like hydraulic cement, the cementing property of which is based on a chemical action of its ingredients when used in the mortar or concrete. Generally speaking, the term "bituminous cement" or "binder" should not be applied to a bituminous material unless it is sufficiently hard at highest normal temperature to require application of artificial heat to reduce it to a liquid, non-cementitious form.

Bituminous Cement Does Not "Set," It Hardens or Binds— We sometimes hear the expression and even see in specifications prepared by some engineers the term "set" as applied to bituminous material used in road construction. For instance, "the road shall be barricaded from traffic until the bitumen has become 'set.'" Bitumen never "sets," at least not in the sense that the term is used in connection with hydraulic cement, i. e., by chemical action. The hardening of a bituminous cement or compound is due wholly to either:

a. Cooling. All bitumen is harder when cold than when heated.

b. Admixture of stone, sand, dust or other mineral aggregate used in the roadway surface.

c. More or less gradual evaporation of the more volatile parts of the bituminous material, the residue being materially harder after such evaporation.

It is best to confine the use of the term "set" to Portland or hydraulic cement and lime, etc., as in the past, and use the term "bind" or "harden" when speaking of "bituminous binder" or "bituminous cement."

CONCRETE AND MORTAR

As is well understood concrete is a combination of mineral aggregate and any kind of cementing material, the whole forming a dense structure approximating solid stone. Concretes are divided into "hydraulic cement concretes" and "bituminous concretes." Neither term should be applied to a combination of materials which does not contain "cements" of one kind or the other, in combination with coarse and fine mineral aggregates so proportioned as to provide a solidity and stability to the mass.

The mixture of sand and cement (or sand and lime) used in masonry construction for binding together the bricks or other material used in masonry is "mortar," not "concrete." So the standard asphalt pavement made of sand and asphalt is a "bituminous mortar" or "mastic" and not a "bituminous concrete" pavement and should never be so called.

BITUMINOUS CONCRETE.

A bituminous roadway surface which does not contain fine particles of mineral aggregate filling the spaces between the coarser particles is not a "bituminous concrete" roadway and should never be so designated, because it is not solid. If enough bituminous cement is used to fill the voids in nearly uniform sized stone, the voids of which would be over 40 per cent of the bulk, there would be such a surplus of pliable, non-stable, viscous bituminous material as not to provide the first requisite of true concrete—solidity and stability. Even when varying sizes of aggregate, each mixed with bituminous cement, are laid in layers, each layer of nearly uniform size stone or other mineral, the coarsest at the bottom and finest at the top (the top course of which is sufficiently rich in soft bitumen so that in the course of years under traffic the fine particles become pressed down into the spaces between the coarser particles below and finally present a hard solid wearing surface) the construction should not be called "concrete," as it was not concrete when laid, nor for many years thereafter.

In the use of the term "bituminous concrete" in connection with roadway surfaces, it should be borne in mind that, prior to the introduction of the bitulithic pavement in 1901, nothing of this character was in use or being laid, and that the laying of mixtures of stone and bitumen in layers of coarse sizes at the bottom and fine at the top had proved unsatisfactory and been abandoned twenty years before, and that the several patents issued to the late Frederick J. Warren broadly cover the use and manufacture of true "bituminous concrete" in construction of roadway surfaces.

"BITUMINOUS MACADAM"

The name macadam road, as is well known, comes from the name of John MacAdam, and refers to a common form of road construction made of separated sizes of stone spread and rolled in layers on the prepared grade, the coarsest sizes at the bottom and the finest at the top, sometimes with intervening layers of intermediate sizes. If carefully laid the fine particles of the top layer become mashed and rolled into the layer below and provide a surface which, prior to the ravages of the modern automobile, made an excellent roadway surface for light traffic conditions.

Mr. Richardson in his communication in MUNICIPAL JOURNAL AND ENGINEER states that the name "bituminous macadam" is applied to a "construction where stone of one size is used." The writer does not agree with this statement, because such a construction is not "macadam" at all and because it is quite contrary to any now accepted use of the term. It is, however, quite clear that the term "bituminous macadam" is a general term which is frequently if not quite generally too loosely used and to such an extent that its use to-day does not give any clear idea of any definite class of construction. In fact, it is improperly and loosely used to refer to any and every form of construction of stone, gravel or slag and bitumen.

Prior to the year 1901 the term "bituminous macadam" was unknown in connection with roadway construction. The term "tar macadam" and "oiled macadam" had been used as applied to true macadam (laid in layers) treated by either mixing or pouring with "tar" or "oil."

The late Frederick J. Warren coined the term "bituminous macadam" as a trade name (referring to a construction directly opposed to macadam—a misnomer) for application to the pavement construction, the introduction of which he was then beginning, under the patents then recently issued and pending, not laid in layers and therefore not macadam at all but "bituminous concrete" made of varying sizes of crushed stone artificially mixed with bitumen, and so proportioned as to give a low percentage of voids and inherent stability to the mineral aggregate; the whole when compressed forming a solid "bituminous concrete." Subsequently, as the possibilities of varying forms of construction under the patents developed, the term "bituminous macadam" was and still is used by Warren Brothers Company as its trade name generally covering all the roadway and sidewalk construction under its patents, varying forms of which are given special names—"bitulithic," "Warrenite," "bitrock," "bitustone," "rockphalt," etc.

Both from point of view of conflict with an established trade name and because the term "bituminous macadam" is being so grossly misused that it means nothing specific the writer suggests that its general use be abandoned and that the term "tarred macadam," "oiled macadam," "asphalt macadam," varying with the class of bituminous material used, be generally adopted as more clearly and correctly describing the varying constructions provided always that the terms are used in referring to roadway construction, which, like macadam, are laid in layers, each layer being a special size of stone.

On behalf of Warren Brothers Company, the writer is authorized to say that, in the interest of clearness of road terminology, and as the name has come to be so badly misused, it will abandon the use of its trade name "bituminous macadam" if leading writers and engineers will abandon its use. Being a badly misused misnomer, let us all endeavor to abandon its further use.

Referring to the communication from a representative of the "Office of Public Roads of the United States Department of Agriculture," we note that the "office has never attempted to distinguish between the term 'bituminous concrete' and 'bituminous macadam.'" We believe that office has also failed to make the distinction, referred to above, between "bituminous binders" or "bituminous cements" and "bituminous dust layers." It has also failed to make proper distinction between roadway surfaces made under the old method of laying different sizes of ingredients in layers, and the modern methods of mixing the varying or graded sizes of aggregate together with the bitumen and spreading the whole in one layer. It is believed that this looseness of use of terms on the part of the Office of Public Roads is largely responsible for the quite general looseness of use of terms which you deprecated in the highly commendable editorials of your issues of June 15 and 29. It is hoped that the Office of Public Roads will "mend its ways" and, in future, use specific terms and apply them more definitely to certain things.

You are to be congratulated in taking the lead in this important matter. It is hoped the influence of your paper will be persistently exercised until uniform terminology in road matters has come to be an accomplished fact.

Respectfully yours,
GEORGE C. WARREN.

EXPERIENCE WITH ALGAE

THE city of Holyoke experienced considerable trouble in 1908 with bad tastes and odors which were increasingly and unpleasantly prominent in its water supply. The high service reservoir in which these conditions appeared to originate was drawn off in the fall and refilled in the spring of 1909 in order to see what effect this, and the frost which would thus be given full effect, would have upon the nitella growths in the reservoir, to which was attributed the bad quality of the water. It was also believed that if the water could be drawn from just below the surface rather than from the bottom of the reservoir, much of the trouble might be avoided; and accordingly a brick well was constructed around the mouth of the intake pipe, in which was a vertical opening which could be closed wherever desired by stop planks.

It was found that the emptying and refilling of the reservoir, while it did not kill the nitella, considerably retarded its growth

and the water was of excellent quality throughout the summer months.

Toward the end of September, however, uroglena was discovered in the reservoir and by the second week of October had caused the water to become so foul that this reservoir had to be shut off from the supply. The growth continued until the second week in January of this year and the odor and taste of the water have been very pronounced. The average number of colonies of uroglena has been about 30, with a maximum of 73 per cubic centimeter. Mr. James L. Tighe, City Engineer, states that their experience apparently points out emphatically that the thorough cleaning of a reservoir basin, no matter how excellent the results may be otherwise, is no guarantee against the growths of troublesome organisms in reservoirs.

BRICK PAVEMENT INVESTIGATION

DURING the week of July 18th two committees consisting of the City Engineers of a number of cities accepted the invitation of the National Paving Brick Manufacturers Association to inspect brick pavements in a number of cities in Ohio and Indiana, with a special view to learning the effect of different methods of construction on the wearing qualities of the pavements. The committees included C. H. Rust, City Engineer of Toronto, Can.; E. A. Fisher, City Engineer of Rochester, N. Y., and C. C. Brown, formerly City Engineer of Indianapolis, Ind., representing a committee of the American Society of Municipal Improvements; and Edward H. Christ, member of the Board of Public Works, Grand Rapids, Mich.; D. M. Roberts, City Engineer of Terre Haute, Ind.; John B. Hittell, Chief Engineer of Streets of Chicago, and Henry Maetzel, City Engineer of Columbus, O., representing the Organization of City Officials for Standardizing Specifications, and all of which, except Mr. Roberts, were members of the American Society of Municipal Improvements also. There were also in the party Mr. H. W. Klausmann, City Engineer of Indianapolis, Prof. I. O. Baker, Dean of the School of Civil Engineering of the Ohio State University, Prof. F. H. Eno, Professor of Municipal Engineering of the same university, and Prof. E. D. Rich.

Each of these committees was appointed by its respective society to recommend at the next convention a form of standard specifications for pavements of various kinds, including brick. The committee of the American Society of Municipal Improvements was provided for at the convention of that Society in October of last year, and the other society at its convention some months later appointed committees for the same purpose. It is to be hoped that the two committees will in some way arrange to agree upon standard specifications and that both societies will unite in recommending a single form which, with this backing, should be quite generally accepted by municipal engineers throughout the country, a very considerable percentage of which are members of one or both societies.

The committees met in Indianapolis on Monday, the 18th, in which city they inspected the rattler tests being conducted by the National Paving Brick Manufacturers' Association, and some of the Indianapolis brick pavements. In the afternoon some very good brick pavements of Terre Haute were inspected. On Tuesday the pavements of Cincinnati were examined, and on Wednesday those in Columbus. In the latter city the committee also visited Professor Orton's testing laboratory, where tests of brick were being conducted with the same kind of rattler and in the same way as at Indianapolis, with the idea of comparing the two sets of results. A discussion of these tests was held with the result that the committee did not feel satisfied that the rattler testing of brick has yet been made satisfactory and suggested further experiments and some changes in the methods of testing. The committee left in the evening for Cleveland, in which city Thursday was spent in examining what several of the members considered to be the best samples of brick pavements which they had ever seen.

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest, Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance

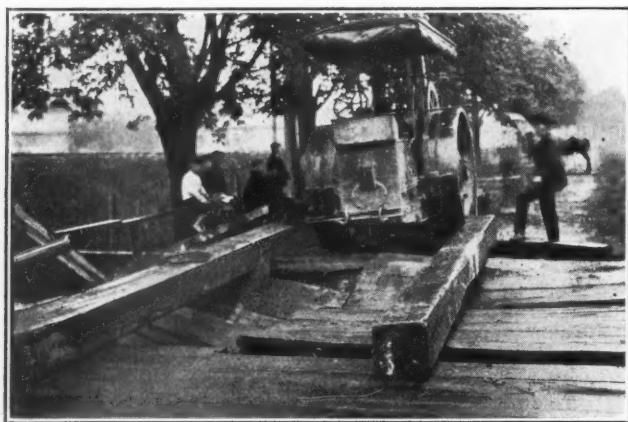
ROADS AND PAVEMENTS

Praise for Paving on New Boulevard

Baltimore, Md.—After inspecting the University Parkway boulevard that is being paved with Fairfield binder on the south side and a Standard Oil material on the north side, Captain Brooke, of the United States Engineer Corps, and a party of engineers and contractors who are engaged in street paving and road-building in the District of Columbia, declared to City Engineer B. T. Fendall that it was one of the finest roadways they had ever seen. Mr. Fendall said that though some of the binder had been down 14 months it was not showing evidence of wear. This boulevard will provide a smooth driveway from the city out to Roland Park.

Steam Roller Breaks Through Bridge

Binghamton, N. Y.—A sixteen-ton road steam roller, belonging to Contractor William J. Dwyer, recently broke through the wooden bridge over Ley Creek, on the Cicero plank road, and nearly plunged into the stream. The bridge could not be used and the traffic was directed over a cross-road to the first tollgate. Contractor Dwyer had used the big roller on the work of the new state road between Cicero and South Bay, which has been under construction



Courtesy Syracuse Post Standard.

STEAM ROLLER PULLED AWAY FROM BRIDGE IT HAS BROKEN

for two years. The machine was being brought to the city under its own power. The forward end of the roller had cleared the bridge, but as the heavy roller at the rear struck the western approach to the bridge it broke through. From 4 until 7:30 o'clock a gang of workmen labored to get the machine out of the hole it had made in the bridge, but they expected it might suddenly drop into the bed of the creek. Blocks were used and the rear of the heavy apparatus was lifted out. Then three teams of horses hauled it up into the road. Little damage was done to the roller, but it was said the bridge would be closed to traffic some time before repairs can be made.

Tar and Oil Better Than Oil Alone in Wood Block Pavements

Cincinnati, O.—At a hearing on the Eastern avenue paving matter before Judge Woodmansee several witnesses testified favorably to the use of tar mixed with creosote oil as a preservative for wooden blocks. A. W. Dow, chemical engineer, New York, said that a mixture of tar and oil was better than oil alone. S. Y. Church, chemist United States Wood Preserving Co., admitted that there was less than 50 per cent distillate oils in the mixture which his company used. More than half the mixture was refined coal tar. The attorneys for the Taxpayers Association endeavored to prove that oil from refined coal tar was all right for paving purposes.

Hoodoo Grade Crossing Contract

Columbus, O.—The largest contract of the grade crossing work on West Mound street has been abandoned by one more contractor. Two years ago the contract was let to Contractor Yoerger, Indianapolis, for \$87,000, \$20,000 less than the engineers' estimate. After a few months' work, Yoerger went into the hands of a receiver. The receiver undertook the job, but never finished it. Then the bondsmen were called on, and they called for bids and awarded the work to MacWardell. Now this contractor has abandoned the job, leaving his valuable machinery. The bond company will be called on to make further arrangements.

Merits of Crushed Rock and Crushed Gravel Discussed

Eugene, Ore.—Crushed rock versus crushed gravel for street improvements occupied considerable time of the Council at its regular monthly session. The discussion arose over "Exhibit A," sent in with a protest against the work on Olive street. The "exhibit" was a piece of rock or gravel $1\frac{1}{2} \times 2\frac{3}{4} \times 4$ inches, and there was but one broken face. Objection was that these rounded rock were little better than straight gravel; that specifications required that the broken rock should pass through a 2-inch ring. Councilman Garrett informed the Council that the agreement with the crusher people back of the butte was that no gravel be sent through the crusher unless large enough to be broken by the jaws, but he was of the opinion that much gravel was being sent through crushers and on to the city streets without being crushed in the least. Councilman Henderson stated that the only way to get crushed rock is to open a quarry, but that this would make the cost out of reason. It was decided that all specifications be made to call for crushed gravel, but that a very limited amount of small, unbroken gravel be allowed. With this understanding, ordinances were passed for the improvement of a number of streets.

To Treat All Roads About City with Oil

Evansville, Ind.—Roads leading into the city and the outer portions of a number of streets will be treated with oil by the city. Experiments will begin at once. If the first roads treated are successful every road around Evansville will be sprinkled with oil.

Cleveland Has Best Pavements, Engineer Says

Rochester, N. Y.—City Engineer Edwin A. Fisher has returned from his inspection trip of pavements in cities of the Middle West. Mr. Fisher is enthusiastic over the pavements in many of the cities, especially those of Cleveland, which he says are the best he has ever seen.

Roadmaking Display at State Fair

St. Paul, Minn.—With a view to showing different methods of road construction J. H. Mullen, Assistant State Engineer, is preparing a display to be shown at the State Fair. With cement and sawdust a miniature roadway approximately two hundred feet long will be exhibited, depicting the evolution in road construction from the old Indian trail to the most advanced method of macadam. Road grading in primitive style, systematic road grading, macadam road construction, gravel road construction, surfacing, drainage, construction of culverts, bridges both steel and concrete will be included. The display will be similar to that at the meeting of the Minnesota conservation congress.

Section Without Oil Is Annoying

Southport, Conn.—A section of the highway from Railroad avenue to Sasco Creek is much complained of on account of the dust, the adjoining sections having been oiled. The authorities may argue that being a State highway, the Commissioner should attend to it. In the Westport section, the first selectman has had the oiling done at the town's expense.

Falsework of Bridge Collapses

Spokane, Wash.—The temporary wooden center span of the new Monroe street concrete bridge collapsed July 21 as the result of a whirlwind amounting almost to a tornado which swept down the canyon of the river. In his official report to the Board of Public Works, the City Engineer calls attention to the huge pillar of dust which preceded the disastrous blast of wind and to the fact that the great arch appeared to be lifted from its position and to fall with a twisting motion, the south end of the span falling to the east and the north end to the west. The City Engineer declares that an event of this sort could not have been foreseen or guarded against and that all proper precautions for the safety of the structure and the workmen employed on it had been taken. The monetary loss in material and labor is estimated at \$25,000, while it is stated that the construction of the bridge has been delayed for several months.

Paving Company Barred

Kansas City, Mo.—The Board of Public Works has refused to award several contracts for asphalt paving to the Parker Washington Company, although it was the lowest bidder. The reason given was that certain streets paved by that company are in bad condition, and the company has failed to make proper repairs. The contracts were awarded to the Cleveland Trinidad Company. President William Bucholtz, of the Board, said he did not consider the company the best bidder that had to be sued on its surety. Judge Ball, representing the Parker-Washington Company, claimed that the matter before the Board concerned only future work, not the errors of past work.

Bad Sidewalk Work

Kansas City, Kan.—Henry E. Dean, Commissioner of Parks and Public Property, has started action against contractors who, he says, have been "jobbing" the city in their work. Recently laid granitoid sidewalks have been found where the contractors utterly disregarded the specifications of the City Engineer. The gravel which is placed under the cement surface of the walk to form its foundation is put in dry and loose, without first being mixed with cement.

As the earth under the walk settles, when cement has not been mixed with it, the loose gravel settles also, and before the walk has been in many weeks only a thin finished surface of cement remains. This is cracked easily and broken. Mr. Dean says that sidewalks in all parts of the city will be inspected and where faulty work is found the contractors will be compelled to put in absolutely new walks, or they will be sued on their bonds. The commissioners also believe that some street paving has been improperly put in and this will be investigated.

Lost Contract Delays Road Work

Toms River, N. J.—A lost contract is holding up work on the county road from Toms River to Lakewood, an important link in the automobile highway from New York to Atlantic City by way of Lakewood. The contract was awarded to F. T. and L. W. Holman, of Whitesville, by the freeholders. It was executed by the contractors and by the county officials, and it was supposed to have been sent to the State road department at Trenton, but State Commissioner Gilkyson says it has not been received and cannot be found in his office. This work may not be completed till summer is over. The lost contract covered the five miles including Main street, Toms River, and half way to Lakewood. Sutton & Corson, of Ocean City, who received the contract for the five miles beginning in Lakewood and running south to meet the other section, have sublet their contract to John L. LeCompte, of Lakewood, who has begun work.

Oil Not an Unmixed Blessing

Van Buren, Ind.—The citizens of Van Buren are raising objections to sprinkling the streets with crude oil for the purpose of laying the dust. The automobile owners state that the oil is ruining their machines, also making it dangerous to drive on, as the machines slip on the oily streets. The ladies are also objecting greatly, as the oil is tracked into their homes. Horses also find it difficult to walk on the streets. On the other hand the oiling of the streets has settled the dust completely, although the smell is not pleasant for the citizens, but the objectionable features will soon pass.

SEWERAGE AND SANITATION**Inspect Model Abattoir**

Dayton, O.—Clerk Harry L. Miller and Plumbing Inspector William Yackley, of the local Board of Health, visited Urbana to inspect the filtration system of the Thomas & Gast packing plant at that city. The Thomas & Gast plant has one of the model equipments of the country and is used as a pattern of hygienic devices in many cities. It is probable that the local officials will also glean some ideas toward the agitation in favor of a municipal abattoir or slaughter house. The Board of Health agitated for such an institution several months ago, and their activities met with considerable support and co-operation. A municipal abattoir or public slaughter house can only be brought about through securing the co-operation of the local packers and extending their operations to an interstate business. The advantages of the abattoir are, in the first place, its facilities for cleanliness and hygienic handling of the meat, such as is rarely found in private slaughter houses; secondly, the constant supervision of United States Inspectors, and third, the economy to the packer, and consequently the consumer, through co-operative use.

Making Pipe for Sewers at Panama

Colon, Panama.—The manufacture of pipe for use in sewers and underground drains has been entered upon by the municipal engineering forces of the Atlantic and Pacific divisions on an extensive scale. A plant has recently been established near the Washington Hotel at Colon, where an average of twelve 30-inch lengths of pipe are turned out each working day. This pipe is made in two sizes, 20-inch and 24-inch, and will be used in the extension of the Colon sewer system. Heretofore vitrified pipe has been employed exclusively in the building of sewers in the cities of Panama and Colon. Cement pipe can be produced from three-fourths to one-half of the cost of vitrified pipe laid down on the isthmus, thereby effecting an important saving.

Progress of Fort Smith Sewerage System

Fort Smith, Ark.—At the present time, aside from the installation of flush tanks, little is being done on sewer construction. Of the whole contemplated system approximating 43 miles, over three-fourths of the construction, lineal measurement, has been completed. In view of the fact that with one exception all the principal trunks are completed, a much greater percentage of the work of building the system has been accomplished. Excluding the south side auxiliary system, the mains yet to be laid are entirely of the minor, lateral class. Construction has so far progressed that practically the whole of the city covered by the water system has sewer service, and large sections of the dry districts are covered, the sewers awaiting the completion of the water extension. The larger portion of the contemplated flush tanks are also awaiting the water extension, as there would be little need for pushing the work of flush tank installation in districts where water service could not be obtained. Ten flush tanks have been installed and are serving the principal sewer channels now in use.

Paterson Mayor Discusses Sewer Problem

Paterson, N. J.—In his annual message, Mayor Andrew F. McBride deals largely with the question of sewage disposal. He would have the city join in the Passaic Valley sewer enterprise, if the costs as estimated by the Commissioners as Paterson's share are correct. He seems to fear, however, that the amount would be exceeded, for he suggests that the Passaic Commissioners take bids for the work, so as to ascertain the exact cost before Paterson decides whether or not to go into the joint sewer construction. If the exact amount chargeable to Paterson cannot be ascertained, Mayor McBride recommends that the city construct a disposal plant for its own sewage.

Rochester's Sewage Plans Turned Down

Rochester, N. Y.—Plans for the disposal of the sewage of the city of Rochester, which provided for a discharge into Lake Ontario have been returned to the city officials by State Health Commissioner Porter without his approval. Commissioner Porter holds that the plans do not provide for a sufficient treatment of the sewage and has indicated that when a more complete system is provided for the plans will be approved.

WATER SUPPLY

Rate Commission Orders Extension of Main

Beloit, Wis.—In the decision handed down by the State Rate Commission the city of Beloit was upheld in the recent ordinance ordering the Beloit Water, Gas and Electric Company to install a 425-foot addition to the water main on Vernon avenue north from Eighth street, which the latter had contested and appealed before the Rate Commission. That the Rate Commission gave the question thorough investigation and consideration is shown by the following from the decision: "It should be unnecessary to suggest that a public utility cannot be required to make extensions indiscriminately, without reference to proper costs and revenues. On the other hand, a public utility may well be expected to incur expense in order to serve citizens whom it cannot now serve, if there is a reasonable prospect of an increase in revenues sufficient to warrant the expense. Such reasonable prospect exists in the present case."

New City Wells Relieve Stress

Dayton, O.—All six of the wells at the new temporary water works pumping station have now been completed and Monday the regular strain on the central pumping station was greatly relieved by the new emergency supply. Water from the last of the six wells to be dug was turned into the city pipes as an addition to the regular "wash day" supply. The last well dug developed a flow of nearly 500 gallons to the minute, and is considered one of the finest water sources in the city.

Hartford's Water Supply Well Maintained

Hartford, Conn.—For the past twenty-five days Hartford has had only one rainstorm. As a result, the reservoirs have been growing lower. Yet there is no cause for fear and the quantity of water on hand is still large enough to cope with the needs of the people of the city for some time to come. Most likely within the coming few weeks there will be sufficient rainfall to restore at least a portion of the water that had been used up during the past month. On July 1 the quantity of water on hand was 2,030,100,000 gallons. On the 20th the readings showed that there were in the reservoirs 1,835,300,000 gallons, indicating that in the past month 194,800,000 gallons of water were used in addition to 12,100,000 gallons which was added to the water supply by the recent storm.

Jerusalem Decides on Municipal Ownership

Washington, D. C.—Even in the benighted realms of the Sultan of Turkey municipal ownership is rearing its beneficent front. The city of Jerusalem, by practically the unanimous vote of its 80,000 inhabitants, recently decided to build water works. No sooner had the vote been cast than a German concern appeared with an offer to construct the plant, pipe the water into every home at a fair rate, and at the end of 20 years turn the works over to the municipality in first-class condition and free from debt. But the matter is in the hands of a special committee, consisting of the Mayor, a member of the City Council, a couple of city engineers and the principal religious officer of Jerusalem, and this committee believes it can do better. It invites the world to come on and bid on the construction of a straight municipal plant, and the invitation has been forwarded to the United States through the American Consul. He suggests that American water works builders enter the competition.

Filtration Basins Leak

Sandusky, O.—Operations have been practically suspended at Sandusky's filtration plant, completed a little over a year ago at a cost of \$125,000. An investigation developed that out of 500,000 gallons of water filtered every ten hours more than 300,000 gallons leaked back into Sandusky Bay, whence it came, through cracks in the clarification basins. Sandusky will have to go without filtered water for some time to come and fear is expressed that typhoid fever, from which the city has been practically free since the filtration plant was completed, will break out again.

Small Percentage of Water Used to Wash Filters

New Orleans, La.—General Superintendent George G. Earl, of the Sewerage and Water Board, says that one of the leading features of this month's operations of the water purification plant is that the percentage of filtered water used to wash the filters has averaged only 1 per cent. which, he says, is probably the lowest wash water record ever obtained. The results were obtained in spite of the fact that water applied to the filters still carries an average of 40 parts per million of suspended matter. Mr. Earl says further that it appears to be pretty well shown that the system of filter and chemical control at this plant will result in a very large reduction of labor, chemicals and wash water over the cost of these items in other plants.

Borough Water Contract Void

North Arlington, N. J.—In the certiorari proceedings brought in the Supreme Court by John A. Bayliss and others against the Mayor and Council of North Arlington and the Mayor and Aldermen of Jersey City, to review a resolution and contract of North Arlington, whereby it attempted to obtain a water supply from Jersey City, Justice Trenchard filed an opinion in the court setting aside the resolution and contract with costs. The prosecutors of the suit contended that neither North Arlington nor Jersey City had legal authority to make such a contract. Justice Trenchard states in the opinion that the only authority to execute such a contract is in the State laws, which provide that it shall be lawful for the governing body of any municipal corporation to make contracts "with any adjoining corporation" to supply it with water. In the present case it appeared that North Arlington is about five miles from Jersey City. The opinion holds that the laws referred to give such rights only to municipalities whose corporate territories are contiguous.

Leakage from Reservoir Gradually Reduced

Providence, R. I.—The leakage at the Fruit Hill reservoir at the present time is 256,510 gallons daily, this total being ascertained as the result of the regular semi-yearly test made by the City Engineer's department. The test was under the direction of James A. McKenna, and was an all-day test. During the test one of the notable features observed was the excessive amount of evaporation from the surface of the water, the heat causing the evaporation to be well above the amount as noted at previous observations. At the March test there was practically no evaporation.

The total amount of leakage as ascertained at the time of the March test was 265,355 gallons daily, and the falling off in the amount as shown by the last test is considered an indication that the leaks in the bed of the reservoir are closing up. With the completion of the installation of the new pumping engines at the Hope reservoir, the Fruit Hill reservoir will be drawn off and the attempt made to locate the leaks in the bottom. This will be a work of several weeks at the least, and it is not deemed expedient to attempt to do the work until there is ample guarantee in the presence of the new pumps in commission against any shortage of water for the high service fire mains. The leakage, which but a few years ago was more than 700,000 gallons daily, has been, by continuous attention to the banks as far down as possible to work with the reservoir filled, reduced to the present figures, and it is the belief of City Engineer Clapp that eventually the leakage can be brought down to a negligible amount when the reservoir can be drawn off.

To Pump from Wells at Night

St. Paul, Minn.—As a result of complaints from residents of Centerville and the surrounding country that the St. Paul Water Board was pumping all the water out of the ground and not leaving any in the shallow wells in that neighborhood the board has decided to do their pumping at night, while the residents of the locality are asleep. These pumps are fed from artesian wells, in some instances almost 300 feet deep, and the water is forced into the reservoir and thence to Pleasant Lake and into Lake Vadnais. The wells of the residents are shallow and the board desires to avoid a lawsuit.

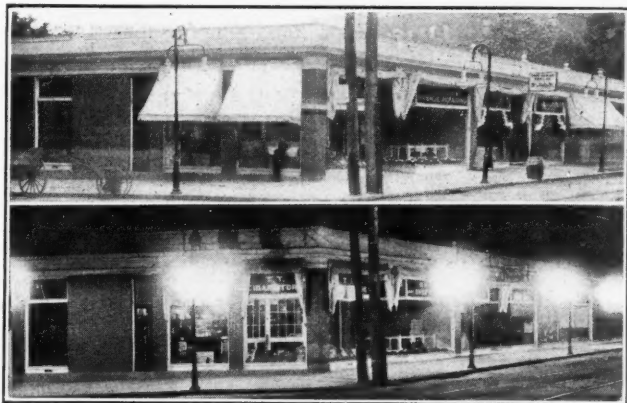
STREET LIGHTING AND POWER

Texas Town Puts Wires Underground

Abilene, Tex.—Abilene has passed an ordinance directing the removal of telegraph, telephone and electric light posts and wires from certain streets within the city limits, and further providing that the wires be placed in underground conduits. September 1 is named as the day when this work shall be completed. The ordinance provides for a penalty of \$10 a day for failure to obey the mandate.

Attractive Installation of Gas Arcs

Binghamton, N. Y.—One of the most notable improvements in Binghamton's business center is the recent installation in front of the R. Z. Spaulding Building on Chenango



Courtesy Binghamton Press

GAS ARC ILLUMINATION—DAY AND NIGHT SCENES

Street of five boulevard lamp posts, each equipped with two inverted Humphrey gas arc lamps. The upper picture shows the building by day and the lower, which gives even greater detail, is a night view.

Town Put in Darkness Through Fear of Cow

Crawfordsville, Ind.—The wheels of the Crawfordsville Electric Light and Power Company were still, every electric light in the city was shut off and each piece of machinery operated by city electricity was "dead" for a period of nearly five minutes recently, while employees at the plant drove out of the building the cow that had strayed through the front door and on into the engine room. The animal was standing near a large and rapidly revolving belt wheel when discovered by the engineer at the plant. Realizing that she might touch a "live spot" in the plant or get tangled up in some of the machinery, the engineer at the plant quickly telephoned to the office to ask Superintendent Ray Thomas what to do. Mr. Thomas promptly sent back instructions to shut down the plant and then drive out the cow. This was done, fortunately, without injury either to the cow or to the plant.

Municipal Light Rate at Pasadena 5 Cents

Pasadena, Cal.—With 3525 of the 4000 subscribers asked for, the Council declared last week for the municipal electric light company a permanent 5-cent rate. The 475 additional subscribers needed, the officials believe, will come in before September. Of these subscribers, 1325 have signed up since the beginning of the whirlwind campaign of the past month.

Troy, N. Y., to Have Dollar Gas

Troy, N. Y.—Troy is to have dollar gas as soon as the ordinance passed by the Common Council is signed and a new contract between the city and the Troy Gas Company signed. A few years ago when the present contracts were signed gas was \$1.25 per 1,000 feet and the gas company made a reduction of five cents each year until the price was \$1.10. Now it has decided to make a standard rate of \$1 for both lighting and fuel gas and asked the city to cancel the old contract so that a new one might be drawn up fixing the rate at \$1. The cost of street lamps will also be reduced proportionately.

Will Light Town from the Third Rail

St. John's, Pa.—Arrangements are being made at St. John's along the Wilkes-Barre & Hazleton Railway to have the current from the third rail diverted for lighting purposes in the various buildings of the town. If sufficient subscribers can be secured it is understood that the company will readily agree to such a proposition. Already several of the summer cottages at Nuangola are lighted in this manner, while farmers are considering the project of operating farm machinery by the same motive power.

Crisis in Wilmington, Del., Light Situation.

Wilmington, Del.—The Wilmington & Philadelphia Traction Company, which now controls both electric lighting systems in this city, has given notice that an increase is to be made in the rates, and the announcement has renewed the talk of a company being started in opposition. It is possible that two, and perhaps three, new companies may enter the field. The plan of the company not only makes a new rate, but is so arranged that the consumer really does not know how much he is using and how much he is paying for. Numerous merchants are discussing plans for the formation of a co-operative company to supply their stores and business houses with electricity.

FIRE AND POLICE

No Cigarettes for Firemen

Canton, O.—Cigarette smokers are now barred from becoming firemen in Canton, under an order issued by Chief Mesnar. "Men who use cigarettes may be all right in brain power, but they lack physical stamina and nerve," said the chief. "The fire department service requires men who have plenty of strength, with the brain to use it properly, and the nerve to make the brain use the muscle in the face of certain or possible death."

Gongs Placed at Firemen's Homes

Dover, Del.—The new electric gongs for Dover's fire alarm system have arrived and will be put in position at once, the equipment consisting of one large gong for the front of the Robbins Hose House and six small gongs for the homes of firemen to be selected by the fire company.

First Aid by Policemen

Kansas City, Mo.—Every Kansas City policeman is to be a first aid surgeon. Each member of the force is receiving instructions in the use of the first aid package in Convention Hall, and this package will form a part of each policeman's equipment from now on. The course of instruction will include forty lectures, six of which already have been given. The first aid idea was originated by the Geneva Cross Society and is used in almost every army in the civilized nations. It has been found a most effective means of saving life in battles, riots, fires and floods. The practical advantage of this instruction can readily be seen, for the patrolman generally is the first man present at attempted murders, suicides and accidents. The first aid package contains two antiseptic compresses to apply in cases where an artery has been severed, one first aid bandage covered with pictures illustrating the methods used in bandaging cuts, broken bones and gunshot wounds, and two emergency safety pins for securing the bandages.

Red Lights Planned for "Fire" Corners

New York, N. Y.—Borough President George McAneny of Manhattan is considering a suggestion made by the Metropolitan Street Railway Company to put red warning signs at street corners which fire engines pass. Frequent collisions between fire apparatus and street cars have been caused, it is declared, because of the absence of warning signals. It is proposed by the railroad company that the city erect signs at the corners of all "fire streets" intersecting surface railroads. These signs shall be permanently located and bear the inscription, "Fire street. Cars halt on this side." President McAneny says he is opposed to additional sidewalk obstructions, but believes there is such merit in the proposition that his objections may be overcome.

New Jersey Town Imports Police Dogs

Glen Ridge, N. J.—“Max” and “Visky,” the Belgian police dogs recently purchased by the Glen Ridge Police Department, have arrived from Brussels and are now in their kennels in the rear of the police station in the borough. The dogs are in the personal care of Police Chief Patrick Higgins, who is seen holding them in leash and muzzle in



Courtesy Newark News

BELGIAN POLICE DOGS MAX AND VISKY

the picture. They are known as Belgian sheep dogs. Max is a black Groendael, and Visky a brown Malinois. They are under two years of age, weighing about fifty pounds are thoroughly trained for police duty and have exceptional records. They are extremely quick in action and probably the most vicious police dogs which have been imported to this country. One of the best experts in this country who passed upon the value of the animals pronounced them the highest type of dogs for police service that he had ever seen. The Glen Ridge authorities are entirely satisfied that the dogs will account for themselves later and demonstrate that police dogs are essential for the protection of suburban communities having extensive territory to patrol.

Conflict of Authority at Fires

New York, N. Y.—Those unfortunate incidents that occur from time to time at large fires were witnessed at the recent Metropolitan pier fire. The fire was under control and the companies were “taking up” when several patrolmen were sent across the street with instructions to compel every one not in uniform to go back to the sidewalk nearly 150 feet away. Medical Officer White and a newspaper man were standing together when one of the policemen approached and gave the order to retreat. The fire surgeon, whose rank is that of a battalion chief, refused to do so. The policeman, after consulting a sergeant, allowed him to remain. Similar scenes were witnessed in other places within the fire lines. The trouble arises from the large number of fire line badges issued, some 3600. It is understood that Commissioner Waldo will soon issue new badges—probably in decreased numbers.

New Caps and Buttons for Police

Waterbury, Conn.—The Board of Safety has decided to discard helmets and equip the police with caps of the same sort as those worn by the police of New Haven and Meriden. The winter caps will be blue and the summer caps white. They have been ordered from Ridebock & Co., of New York. New buttons for uniforms have also been adopted, instead of having the letter P, the gilt buttons will have the seal of the city. They will be furnished by the Waterbury Button Co.

Fire Limits Extended

Paterson, N. J.—Mayor Andrew F. McBride has signed an ordinance which readjusts and extends the limits within which frame structures of a non-fireproof character may not be erected.

Handsome Fire House in New Jersey

Jersey City, N. J.—Greenville will soon be the proud possessor of one of the handsomest fire houses in the State of New Jersey if not in the Metropolitan district. The new structure will be reared at Bergen and Van Nostrand avenues on a plot fronting fifty feet on the first named thoroughfare and approximately one hundred feet on the other one. The building will be seventy-eight feet deep and the full width of plot. It will be two stories in height with a cellar under the rear portion. The front on both streets will be of golden brown waterproof brick with limestone trimmings and blue stone water table, topped out with neat Spanish tile cornice. Two large doorways are arranged for the Bergen Avenue front, each 12 feet wide, to accommodate two companies. Ample room is provided for two separate companies and will include an automobile mechanical engine and hose carrier, also a steam engine and hose wagon. Accommodation for six horses with feed chutes, drinking troughs, etc., will be most conveniently arranged. The stalls will be equipped with automatic release chains so that each horse will be released immediately on the sound of an alarm. The interior of the apparatus room will be lined with a white impervious brick and the floors will be of concrete and rock asphalt. The workshop for general repairs will be most conveniently located off of the apparatus room, which apartment will be equipped with a work bench and up-to-date tools of every description. The captain's desk will be located on a platform in the front corner of the apparatus room with every possible convenience and a very complete system of appliances for receiving alarms. The wide entrances will have sliding doors hung on ball-bearing sheaves arranged to operate with the least possible exertion. There will be ample accommodations in the rear of the apparatus room for the housing of fuel truck and the exercise wagon with an independent exit. The second floor will contain two dormitories which will accommodate ten men in each. There will also be two good-sized officers' rooms, each having direct drops to the apparatus room, and convenient closets and lavatories. A large locker and drying room is arranged between the officers' rooms and the dormitories, which will be equipped with the latest approved steel lockers, one for each fireman. The bathroom adjoining will be fitted with a bath tub, shower bath, lavatories and other accommodations with direct access to the apparatus room with drops and the main stairway. The hay loft, with ample room for storage of feed, etc., will occupy the rear of the building directly over the stalls on the main floor, and will be fitted with feed chutes and two doors for the delivery of feed.



NEW JERSEY CITY FIRE HOUSE

GOVERNMENT AND FINANCE

Chelsea Cuts Tax Rate

Chelsea, Mass.—Despite the heavy expenditures entailed upon the city as a result of the fire of April 12, 1908, when property valued at \$17,000,000 was destroyed, with only \$8,826,879 of insurance, and \$5,427,150 of assessable property was burned, the assessors have announced that the 1910 tax rate would be \$22.40, or sixty cents lower than last year's rate.

Covington May Vote on Commission Government

Covington, Ky.—Within a week five hundred petitions asking that the question of changing the form of government of the City of Covington to the commission plan, will be in circulation. The petitions will be placed in the hands of the citizens who are urging the change, and they will proceed to secure signatures at once. At least 25 per cent. of the qualified voters at the last election must sign the petition, which will then be presented to the County Judge. "The Commission Government League," composed of a number of the most prominent business men of the city, is rapidly growing.

North Platte Now City of First Class

North Platte, Neb.—Governor Shallenberger has issued a proclamation declaring North Platte to be a city of the first class, having more than 5,000 and less than 25,000 population, and subject to the provisions of the law governing cities of that class.

Private Investors Take \$5,000,000 Philadelphia Loan

Philadelphia, Pa.—Five million dollars of 4 per cent. 30-year bonds were sold last week to private investors. The loan was oversubscribed by more than \$3,000,000 besides \$1,500,000 subscribed for by banks. No bonds were allotted to the banks. Mayor Reyburn said: "The success of the popular subscription will be a good thing all around. In the first place it will interest a lot of people in the city government. It brought out money from hiding places. One woman had \$1000 in gold she would not entrust to banks. Those who have their money invested in municipal bonds will have a deep personal interest in civic affairs. They will make it their business to know whether the city is being well governed or not. It won't be easy for blather-skites to lead them about by the nose. They will vote on first-hand information."

Eight-Hour Day for Municipal Work in Pennsylvania

Pittsburg, Pa.—The Superior Court has handed down a decision upholding the eight-hour labor law and affirms the conviction of John F. Casey, contractor, who was fined in the quarter sessions court. The suit against Casey grew out of his employing men for nine hours and ten hours a day, while the 10 new filter beds were being constructed at the Aspinwall filtration plant. Westwater & Casey had the contract for the work. An appeal was taken from the decision of the local court attacking the constitutionality of the law and contending it did not apply to municipal contracts. Judge Orlady in affirming the decree, says: "The ruling that a state may limit the hours of labor of its employees can not be disputed, and that a person contracting with it is bound by such a regulation logically follows."

STREET CLEANING AND REFUSE DISPOSAL

Milwaukee Mayor's Novel Ideas of Street Cleaning

Milwaukee, Wis.—Prizes for children in connection with keeping the streets of Milwaukee clean and the elevation of the "white wings," giving trustworthy ones power to arrest for violation of health ordinances, are among the recommendations embraced in a special message of Mayor Emil Seidel (Social Democrat), which he will have printed and send to every member of the Common Council. "The place to begin is with the child," says the Mayor. "The boy and girl can be an auxiliary to our street cleaning force. Let us reward the child that adds to the greatest extent in removing litter from the streets, alleys or vacant lots." As prizes he suggests monthly outings, picnics, a souvenir medal or other recognition.

Will Gather Waste Paper

Camden, N. J.—Through a system he expects to inaugurate in Camden the first of next month in the collection of waste paper, Street Commissioner Sayrs says that sufficient funds would be realized in the sale of the paper to probably more than pay his salary. He will expect help from all enterprising citizens, he says, in the move to make Camden a cleaner city. The Commissioner suggests that the business men and householders follow the example of some Chinamen, who tie their waste paper in packages to be placed next to the garbage box on the sidewalk. Wagons for the collection of the paper only will carry the bundles to a baling machine that will be located near the Federal street bridge, at Cooper's Creek. The present force of men will be expected to do the work.

Sweeping Streets at Night

Decatur, Ill.—The system of street cleaning by sweepers working individually in the day time has been abandoned on 30 blocks of the main streets and night sweeping by horse machines has been substituted. Under the old plan the work cost about \$175 a week, while the new system requiring the use of three teams, four hand sweepers and two carts costs approximately \$200 a week. The work will be continued in this way until a flushing machine, which has been ordered, is received, when there will be another reorganization.

No Place for Garbage

Elwood, Ind.—Both the City Health Board and Council have admitted themselves powerless to cope with the question of disposing of the accumulating garbage in the city during the present summer, and the matter is one which is being anxiously discussed by all those in authority locally. For several years the garbage furnace has been in bad repair and it is now in such a condition that it is practically impossible to burn the refuse which accumulates. Throughout the greater part of the year it has been the custom to haul the garbage to farms near town, where it has been used by the farmers as fertilizer.

Now that the fields are filled with grain and the farmers are at work they will not permit the dumping of the garbage on their property and no suitable place can now be found for it. Within a few weeks with the gathering of the crops this condition will right itself, but just at the present time it is one causing much worry.

To Collect Garbage Only

Harrisburg, Pa.—An ordinance has been introduced in Council by B. F. Snively providing that after the first of January next, garbage only and not ashes be collected by the garbage contractor. This will reduce the cost of collection \$10,000 a year. The collections would be twice a week in summer and once in winter instead of once a week the year round. The Pennsylvania Reduction Company is willing to make the change though their contract has eight years to run.

New Refuse Ordinance

Millburn, N. J.—A new ordinance relating to the removal and disposition of garbage, ashes and other refuse matter is now in effect, by vote of the Board of Health. It contains four sections and provides a \$10 penalty for a violation. The ordinance provides against throwing or depositing paper, scraps or animal matter in the streets; against allowing a noxious smell to arise from any property, and for the separation of wet garbage from other refuse when placed at the curb for collection. No receptacles shall remain at the curb for more than twelve hours.

Wants to Know How Much Heat Garbage Plant Can Supply

Minneapolis, Minn.—J. D. Holtzermann, of the Board of Charities and Correction, says that the Board would ask the Health Department just how much heat and electricity it will be able to furnish during the winter months to the City Workhouse and Hopewell Hospital from the garbage crematory heating plant. If not enough can be furnished, the Board will go ahead and build its own plant, declares Mr. Holtzermann.

RAPID TRANSIT

To Construct Railway Loop for East Boston Tunnel

Boston, Mass.—Both the Boston Transit Commission and the Boston Elevated Railway Company are about ready to proceed with the completion of the East Boston Tunnel. That the tunnel was built to a stub end at Scollay Square was merely a temporary arrangement which had in view an expansion of the system to Cambridge, and there was some talk at the time that the tunnel cars should be switched into the Tremont street subway and go out over new tracks to Cambridge. Such arrangement, however, does not fit into the system as later developed, and it never met wholly with the approval of the Transit Commission, because it would establish a crossing of tracks in Scollay Square. Now there is clamoring from East Boston for better service in the tunnel, and a strong agitation in favor of a new tunnel for the Boston & Eastern Electric Railroad, and the Boston Elevated has practically decided to agree to a completion of the tunnel on a plan that will avoid grade crossings in Scollay Square. Three studies have been prepared by the Transit Commission, and all of them provide for a loop in the square, under the present station. Construction work has to be done by the City of Boston, under the direction of the Transit Commission. The Boston Elevated road, whose approval of the plans is necessary, has practically given its consent. It may be found necessary, however, to go before the Legislature next year for additional legislation to authorize new bonds. Just how much the new loop will cost has not been determined, but it is likely to cost a little more than there is left of the original East Boston tunnel appropriation, which amounted to \$3,193,000.

Regulating Pittsburg Railways

Pittsburg, Pa.—The movement to regulate the Pittsburg Railways Company to give satisfactory service was followed by Councils at their last session for the summer. Of the ordinances relating to street railway traffic that which regulates the crowding of cars, a substitute for the original bill, was reported from the corporations committee in Select Council by John A. Sauer. The original bill prohibited the company from operating a less number of cars than would seat five-sevenths of the passengers. The substitute provides in addition that passengers shall not be carried between the seats of summer cars, and that no more than five passengers shall ride on platforms. Exceptions are provided for the Fourth of July, and for baseball and football games. The ordinance repealing the Pittsburg, Oakland and East Liberty franchise declares that its terms have not been complied with. The new ordinance relating to track construction and street repaving was offered in Common Council by John J. Byrnes. It provides for two types of track, differing chiefly in the kind of bed upon which they are to be laid, according to the kind of paving of the street where track are permitted.

New Style Fare Boxes

Newark, N. J.—The Public Service Railway Company intends to install a new style of fare box on its P. A. Y. E. cars shortly. The Oakland avenue cars are the first to be equipped with the new device. The new boxes have a metal cap, concaved, in the center of which is a round hole, large enough to admit a nickel, a penny or a dime, but too small for a quarter or a half dollar to go through. This device prevents, as sometimes occurred with the old boxes, the dropping of a larger piece of money into the receptacle by a passenger in haste and will save the conductors many disputes.

Does Non-Compliance with Ordinances Forfeit Franchise?

St. Paul, Minn.—The city railway, because of its apparent determination not to comply with the Corning ordinance, which would compel the company to sprinkle between the tracks, may have to fight now to retain its franchise. Mayor Keller, who has for several years been trying to get this corporation to comply with certain requests following action by the City Council, sent a letter to Corporation Attorney Michael asking for an opinion as to whether the railway company had not forfeited its charter by not complying with the latest ordinance.

MISCELLANEOUS

Weekly Baths for Everybody

Aurora, Ill.—Aurora residents, especially foreigners, are ordered, in a list of rules just issued by the Board of Health and signed by the Mayor and Chief of Police, to take a bath once a week or be arrested. Copies of the order are to be placed in all of the boarding houses and homes of foreigners in Aurora. The rule fixing the number of baths that a man shall take is only one of fifteen issued by the board. Women are told to scrub their floors once a week, sweep all carpets, air bedrooms and keep yards clean or be arrested. One rule says that but two shall be allowed to sleep in a bed.

Annexation Election to Be Called in Berkeley

Berkeley, Cal.—Mayor Hodghead and the members of the City Council are preparing for the formal issuance of an election call for the proposed annexation of Berkeley and Oakland in accordance with the notice received from the council of the latter city that September 15 had been decided on as the date. The Berkeley Council will offer no opposition in the proposed election, believing that the issue will meet with overwhelming defeat at the polls.

Moline Has Municipal Baths

Moline, Ill.—Last week there was opened a system of municipal baths free for men and boys, and maintained by the city free of cost to the users. Since the plan was evolved some little time ago the merchants have all fallen in line, and while the bathing quarters are being prepared donations of soap, toweling and all other paraphernalia have been readily forthcoming from the merchants themselves. The baths, which are showers, are located in the old hose house building, Twelfth street and Third avenue. There is a caretaker and the baths are open every day.

Extensive Municipal Repair Shop

Milwaukee, Wis.—It is announced that a municipal repair shop, to combine the present shops of the various departments, will be established in the near future by the city of Milwaukee. The site will be on the river, so that boilers and machinery from the fire boats may be readily handled. All heavy machinery is to be on the first floor, and the shop will be laid out in such a way as to permit of indefinite expansion. The equipment will cover foundry, forge, machine and carpenter work. Aside from repairs, the intention is to have the city build much of the apparatus which it uses. This is done to some extent at present by the fire department.

Municipal Playground Cadets Take Field

Oakland, Cal.—Fully equipped for the field, the Municipal Cadets left the Bushrod Park playground for their first encampment. Two hundred of the youths, all uniformed and carrying guns, blankets, canteens and knapsacks, started on the long walk which took them over the Berkeley hills, through the Morago valley and to a camping site at Redwood Peak. Major Ray Campbell, Elbert Vail, director of the Bushrod playground and George E. Dickie, superintendent of playgrounds, led the three companies. Wagons furnished by the Street Department followed the line of march, carrying the food and tents of the youthful soldiers. Every one of the 200 will have his own duty to perform. The company cooks will provide the meals, and sentries will be posted all night about the outer lines of the encampment. Scouting and various other military maneuvers will take up the hours of the first day. Target practice will be indulged in, to be followed by a sham battle, in which two companies, picked from among the entire corps, will oppose each other. The battle will be followed by another meal, after which the cadets will break camp and start on the march to Oakland.

New City Map Being Made

Muncie, Ind.—A new map of Muncie is now being completed by L. E. Bunting, a civil engineer of New Castle. Mr. Bunting has been working on the map for some time, and the drawings are now completed and the map will be ready for publication within a few days. The new map, which will be the first completed of this city since 1903, will contain all of the new additions and subdivisions that have been added to the city in recent years.

Hundred Million Dock and Terminal Plan

New York, N. Y.—Dock Commissioner Calvin Tompkins has submitted to Mayor Gaynor an outline of a plan for extensive dock and terminal improvements. The plan involves the construction of an elevated line along the west side water front, eliminating the New York Central surface tracks and connecting large terminal buildings to be erected on the blocks bounded by Thirty-eighth and Fortieth streets, Eleventh and Twelfth avenues and Twenty-fifth and Thirtieth streets, Ten and Twelfth avenues, and a double deck freight yard on the blocks bounded by West Houston and Spring streets, Washington and West streets. It is planned to have these buildings twelve stories high, and with the yard they are to be connected with the piers by branches from the elevated line. Under the plan all the railroads which come into New York are to have joint use of the terminals. The project will go before the Board of Estimate in the fall.

Improved River and Terminal Facilities Planned

St. Paul, Minn.—St. Paul in the not far distant future will have a new depot and one of the finest harbors north of St. Louis, when the plans of the depot committee which met last week at Mayor Keller's office, are carried out. City Engineer L. W. Rundlett has prepared a blue print of the proposed harbor and depot facilities, which was inspected and discussed by the committee. A subcommittee composed of M. D. Munn, L. W. Rundlett, City Engineer, Henry G. Hass, C. R. Smith and F. J. Waterous, will confer with the United States army engineers in charge of river improvements. Another subcommittee, composed of J. N. Jackson, Mayor Keller, R. C. Kirk, Eli Warner, Assemblyman Otis, Alderman Corning and City Engineer Rundlett will confer with railroad officials. In this way the improvements will be made in harmony with each other.

New York Has Model Weights and Measures Ordinance

New York, N. Y.—The new weights and measures ordinance which went into effect August 1 amends the old ones relating to weights and measures and is the work of Mayor William J. Gaynor, who has devoted much time to the work of reconstructing the Bureau of Weights and Measures, as well as creating new laws and rules for the better protection of the public against "short-weight" dealers. All scales, weights and measures must hereafter be tested and sealed at the Bureau of Weights and Measures. Any change after this test will subject the owner to a fine of \$100. The new ordinance prohibits the sale of butter in prints unless it is weighed in the presence of the consumer, each print being devoid of wrappings of any character. In the case of ice the weight must be demonstrated immediately before delivery. Violation of the new ice regulation means a fine of \$50 for each offense. Short-weight scales are to be confiscated as formerly, but the new ordinance provides that a fine shall be imposed where the owner is found to be wilfully in possession of such scales.

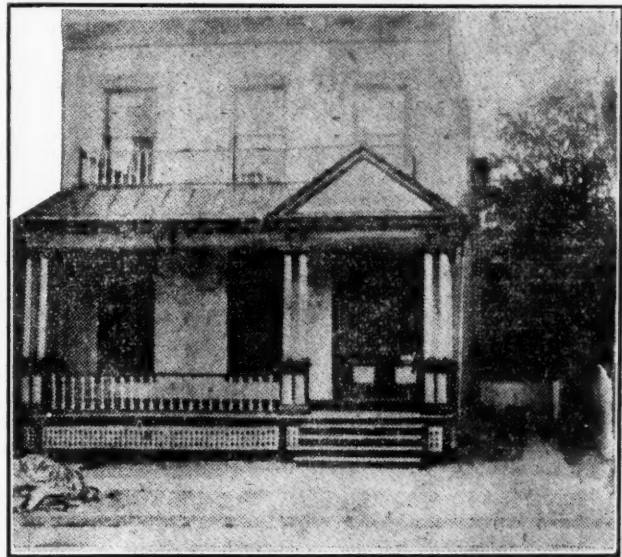
Short measure devices, such as pails and baskets with false bottoms and cans with double interiors, are prohibited under the penalty of a fine of \$100. In addition, Mayor Gaynor has caused Police Commissioner Baker to bestow power of arrest on inspectors of weights and measures who now may take short weight dealers and peddlers into custody on the spot.

Browntails Invade Brockton

Brockton, Mass.—Millions of brown tail moths swarmed the city last week, causing much alarm among city officials and forcing the new Moth Inspector, N. S. Souther, to summon extra help to fight the pest. Driven as if before a storm, the moths invaded every section of the city, were so plentiful that the fronts of stores and the telephone, telegraph and electric light poles were almost as white as a morning following a snow storm. The moths swarmed around the electric and gas lights, thousands dropping on the heads of persons passing by. A number of cases of poisoning have been reported and physicians have been kept busy administering lotions. Inspector Souther has been devoting all his energy to an extermination of the gypsy moth, which has already cost the city thousands of dollars. The new danger means the expenditure of additional thousands.

New Lodging House Ready for Opening Next Week

Syracuse, N. Y.—The new Municipal Lodging House at No. 302 West Willow street, with accommodations for fifty persons, will open next week. Painted, refinished and remodeled, the building is said to be a near approach to a model lodging house for wanderers. Tramps who spend a night in the new dwelling will be the cleanest lot of "vags" ever turned out. The tramp, on applying for shelter, will be ushered into a dressing room after he has eaten supper and compelled to disrobe and take a shower bath. He will then be given a clean nightshirt and socks for night wear and will retain a check for his clothing. His clothes will be thoroughly fumigated during the night, and when the



MUNICIPAL LODGING HOUSE, SYRACUSE, N. Y.

"Weary Willie" emerges for breakfast all there may have been of dirt will have disappeared. The lodgers will not enter the front door, but through a side, rear door. Upstairs are several separate rooms for women, old men and persons who are ill, while on the third floor, in front, is the dormitory, with clean cots and good ventilation. The building will be heated by a hot air furnace. The dining room is at the rear, near the receiving room, and the register of names will be kept there. The cage for insane men is on the lower floor in the center of the building, while that for women patients is at the front, on the second floor. The main office is on the street floor. It is fitted up with a desk, library table, chairs and a rug, but no muddy boots will get across Superintendent Prosser's new rug. The regular business of housing vagrants will not begin until the weather begins to get cold, but the cages and rooms for aged or sick will be in use next week.

A Municipal Henhouse for Negro District

Pittsburg, Pa.—Director E. R. Walters of the Department of Public Health has diverted his attention from the smoke nuisance to hens. He had decided that the negro hill district must have a public henhouse. He has found that hundreds of families keep chickens in the cellars of their homes in this congested neighborhood. Since they must have chickens, and cheaply, there is only one solution, according to Director Walters. That is a municipal henry or poultry stockyard and slaughter house.

Ordinances on Autos, Barns and Fourth of July

Alexandria, Ind.—Three important ordinances are in process of construction and are expected to be ready for the consideration of the City Council at its next meeting. One relates to the speed at which automobiles and motorcycles may be driven in the city, another provides for the observance of the Fourth of July along sane lines, and the third prohibits the building of barns along the streets of the city near the sidewalks. The ordinances are being drafted along lines which have been successfully followed in other cities.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Ruling of Interest to Municipalities

Rate Regulation—Electric Railroad

Portland, Ry., Light & Power Co. v. Railroad Commission of Oregon.—The fixing and enforcement by a Railroad Commission of unjust and unreasonable rates for transportation by railroad companies is an unconstitutional denial of the equal protection of the laws, for a corporation cannot be required to use its property for the benefit of the public without receiving just compensation for the services rendered. The requirements of the fourteenth amendment to the federal Constitution apply both to privileges conferred and liabilities imposed, and no greater burdens may be imposed on one than are laid on others in the same calling and condition. An order of the Railroad Commission requiring an electric railroad to cease an unlawful discrimination between the passengers from one locality and those from another locality by desisting from refusing the latter the same transfer privileges voluntarily accorded to the former may be complied with by giving transfers to all or by desisting entirely from giving transfers, and it is not a positive command to give transfers. The fact that a rate imposed by a carrier is per se reasonable does not disprove the charge that it is unlawful, for, where rates are relatively unjust so that undue preference is afforded to one locality or undue prejudice results to another, the higher rate is unjust, though it is not in itself excessive. The right of one locality is not increased by the fact that it conveyed to an electric railroad the value of the roadbed, nor is the right of a competing locality diminished thereby, but the rates for the two localities must be equal. The Portland city charter, authorizing the city to prescribe rates for transportation of passengers or property within its limits, and Laws 1907, providing that the act regulating carriers shall not apply to the transportation of passengers carried solely within the limits of cities by street and other railroads, do not prohibit the Railroad Commission from regulating rates on traffic originating or extending beyond the boundaries of the city of Portland.—Supreme Court of Oregon, 109 P. R., 273.

Space Under Bridge—Market

Sorgen v. Prendergast, Comptroller, et al.—A space under the approach of a bridge, occupied by fish peddlers pursuant to the permission of the Commissioner of Bridges, in consideration of payments made by them to the City of New York, is a "market," though not formally so declared, as authorized by Greater New York Charter, Laws 1901, and it is under the control of the Comptroller and his Department, as authorized by section 151, and not under the management of the Bridge Commissioner, under section 595 and 596.—Supreme Court, New York, 123 N. Y. S., 765.

Closing Streets—Damages

In re Grote St. in City of New York.—Laws 1895 provides for the assessment of damages to property owners suffered by reason of the closing of streets, and declares that if the claimant does not present a written statement or claim for compensation within six years after filing of a map closing a street he shall be forever barred from claiming compensation therefor. Held, that where claimant failed to file a claim for compensation by reason of the closing of a street within the time specified, her right to compensation was barred, though some time after the street was closed she conveyed the property to another, who filed claim within the statutory period, not in her right, but in antagonism to her; she not being entitled to any rights under claims so filed.—Supreme Court, New York, 123 N. Y. S., 619.

Railway Stockyards—Nuisance

Town of Colton v. South Dakota Cent. Land Co. et al.—Railway stockyards in the residence district of a town may be prohibited as a nuisance, irrespective of the condition in which kept.—Supreme Court of South Dakota.—126 N. W. R., 507.

Accord and Satisfaction—Bridge Contract

Matheney v. City of Eldorado.—A contractor undertook to build a bridge for a city, and arranged with a banker to furnish the money necessary to carry on the work, and he gave the banker a writing to the effect that all warrants for the construction of the bridge should be issued to and cashed by the banker. A dispute arose between the city and the contractor as to the amount due for certain extra work done on the bridge. Later an allowance was made by the city in full payment of the work which the contractor refused to accept. He then informed the banker that the allowance must not be accepted. A warrant was drawn by the city for the allowance and placed in the bank where the funds of the city were kept in the custody of the son of the banker who was Deputy City Treasurer. Some time afterwards the banker, without other authority than the writing mentioned, drew the money on the warrant, but neither the contractor nor the Mayor and Council of the city had any knowledge that the warrant had been cashed until long after this action to recover the amount of the claim had been brought. Held, that the banker had no authority to make settlements for the contractor, and that the drawing of the money on the warrant did not operate as an accord and satisfaction of the original claim, nor preclude the contractor from recovering the entire debt.—Supreme Court of Kansas, 109 P. R., 166.

Defective Highways—Liability of Commissioner

Booth v. Town of Orleans.—Laws 1881, making towns liable for injuries from defects in highways, where theretofore highway commissioners had been liable, as amended by Laws 1890, provides that every town shall be liable for damages to person or property sustained from defects in its highways, existing because of negligence of any commissioner of highways of such town. Held, that the liability of the town is wholly based upon the negligence of the commissioner and the town itself, if judgment is obtained against it for such negligence, has recourse against the commissioner personally.—Supreme Court, New York, 123 N. Y. S., 700.

Dedication of Street—Presumption from User

Ackerman v. City of Williamsport.—Where a bridge company constructed a road as an approach to a bridge over its own land carrying it over a basin by a small bridge, and, after the main bridge had been condemned, abandoned the approach, including the bridge over the basin, and the city in which the road was located, though it continued to be used by the public, assumed no care of the bridge over the basin, so that it fell into disrepair, and a person was injured 30 years after the construction of the road and 14 years after its abandonment by the bridge company, the city was responsible for the injury; acceptance of the dedication of the bridge being presumed from user.—Supreme Court of Pennsylvania, 76, A. R., 423.

Public Improvement—Assessment of Railroad Property

New York Bay R. Co. v. Mayor and Common Council of City of Newark et al.—A city lot, owned by a railroad company, which is vacant and not used for railroad purposes, and not within the present or proposed lines of the company's right of way, nor necessary at present for the enjoyment of its franchises is liable to assessment for street improvement, though the land was acquired by the company with the intention of using it some time in the future for additional tracks when required by the exigencies of its business.—Supreme Court of New Jersey, 76 A. R., 327.

Defective Streets—Duty to Repair

Ottolengui v. City of Seattle.—The road over which plaintiff's mother was riding in an automobile when it turned over at a point where the road connected with an unopened platted street, because of its rough condition, was within the city limits, but was constructed over private land by real estate agents for their own purposes, the city having refused to improve or exercise any control over it. Held, that as the city was not bound to maintain either the road or the platted street and had not undertaken to do so, it was not responsible for the unsafe condition of the road.—Supreme Court of Washington, 109 P. R., 206.

NEWS OF THE SOCIETIES

National Good Roads Association.—

The third annual congress met at Niagara Falls, N. Y., July 28. President A. L. Jackson called the meeting to order. Mayor Douglass was introduced and welcomed the delegates. President Jackson replied, speaking of the attractions of Niagara Falls, which might be still greater if the country possessed a system of good roads. Congressman William F. Sulzer was then introduced, who spoke of the national aspects of the good roads movement and of their paramount value to the farmer. He said he would do all he could to secure good highways in the agricultural districts. James S. Simmons, Congressman from the Niagara Falls district, was introduced, and he pledged himself to do all he could to secure national aid for better highways. Chester C. Platt, editor of the *Batavia Times*, spoke of the value of good roads as feeders for the railroads, connecting them with the farms. B. F. Yokum was the principal speaker Thursday afternoon. He said, in part:

Government statistics tell us that it costs our farmers 15 cents more to haul one ton one mile in this country than it costs in European countries. The products of the farms of the United States last year amounted to approximately 250 million tons. The government shows the average haul of a ton was 9 miles. This difference of 15 cents a ton per mile represents an additional cost of \$1.35 a ton for an average haul of 9 miles. Estimating that two-thirds of the agricultural products of last year were hauled away from the farms, there would have been a saving to the American farmers of 225 million dollars if our roads had been up to the standard of European roads, not including their back haul of supplies from the stations to the farms. They would also have saved large sums in the cost of replacing and repairing harness, wagons, etc., and in the investment and care of extra draught stock. *** We have two million one hundred thousand miles of public roads. From the best information obtainable there are about 44,000 miles, or two miles out of each 100, under a high standard of improvement. There are not more than 175,000 miles, or eight miles out of each 100, under any kind of improvement. In other words, we have 1,925,000 miles of public roads which are in as poor condition now as they were when they were laid out by our early settlers and pioneers. *** If we build 100,000 miles of public highways annually for ten years, and give to this country one million miles of good public roads at an average cost of \$3,000 per mile, or \$300,000,000 annually, we will be engaging in a national development, the advantages of which in economics, commerce, comforts and enhanced land values, none can foretell. We will be accomplishing something worth while.

J. Hampton Rich, of North Carolina, and John Grafts, of Alabama, spoke of the special need of good roads in the South. As an instance of the value of good roads, Mr. Rich said he knew of two properties, one of 90 acres, for which \$90,000 was recently refused, on a good road, the other of equal producing value 25 miles away on a bad road, worth only \$15 to \$25 per acre. The building of a State highway—a Niagara Way, that will outrival the ancient Apian Way—extending from the seaboard at New York to the Fall of Niagara, was advocated on the last day of the meeting. A resolution calling upon the Governor of the State, the Legislature, the Mayors of the cities in the Hudson and Mohawk valleys and all along the route to Niagara Falls, to work for the construction of such a highway, was unanimously adopted by the delegates to the Congress. Another resolution introduced for former U. S. Senator Dodge, of Ohio, calling upon the Federal government and the members of the House of Representatives and the Senate to urge an appropriation for the building of good roads was

adopted unanimously. The desire of the congress is to obtain an appropriation, have a commission appointed and treat the good roads movement in the same way the government is now treating the waterways. The plan contemplates the construction and maintenance by the States and the Nation of permanent highways connecting Washington with the capital of every State in the Union, the cost to be borne by money loaned to the States at interest by the Federal government under the provision of the Sulzer Bill, which will be introduced for a second time at the next Congress. The resolution also suggested that the electors of the country instruct their delegates to favor all measures in the interest of good roads; urges producers, consumers and transportation organizations and education associations and farmers work hand in hand for betterment of the highways. One of the most interesting addresses of the last day's session was that of A. Munro Grier, K.C., who spoke for Mayor O. E. Dores, of Niagara Falls, Ont. His idea of the proper way to get good roads is this: Get the individual interested through his family, then the community, then the town, then the city, then the State, and finally the country. "Let there be nothing good said about a bad road. If the road is rotten say so, and what will you get—a felling of shame, and finally a village will be known for its good roads, the town will be known for its good roads, and so on right through the State and the country." A. G. Spaulding, San Diego, Cal., explained the system of road construction and maintenance in his State. James L. Cowles, secretary of the Postal Progress League, spoke of the value of roads in regard to efficient postal service. A letter from F. A. Delano, president of the Wabash Railroad was read, in which he assured the delegates that he would do all in his power for the advancement of the good roads movement. The convention came to a close after extending a vote of thanks to the press, the local committee and others who have aided in making it a success.

Ohio Electric Light Association—At the sixteenth annual convention, at Cedar Point, July 26-28, papers were read on the following subjects: Low Pressure Turbines and Their Operation, by W. C. Anderson; Turbine Troubles, by Frank Brosius; Motors for Single Phase Circuits, by Prof. F. C. Caldwell; Progress in the Introduction of Electric Vehicles, by J. T. Kermod; Methods in Getting New Business in Cities of 15,000, by L. A. Petit, Jr.; Series Tungsten Lamps for Street Lighting, by Claude Smith, C. C. Custer, and Frank Jackley; Tungsten Lamps vs. Central Station Earnings, by E. L. Booth; Central Station Facts and Factors, by J. R. Cravath; Outline of an Equitable Power Rate, by B. H. Gardner; Methods of Maintaining Electric Meter Accuracy, by John Gilmartin; Best Methods in Purchasing Station Apparatus, by R. J. Feathers.

Western New York Volunteer Firemen.—At the centennial celebration, Fredonia, N. Y., July 30, there were 61 companies in line, and it took the parade 25 minutes to pass the reviewing stand. Among the prizes awarded for the events were the following: Best appearing company with band, Citizens' Hose, of Brockton; best uniformed company, Huntley Hose, of Silver Creek; hose race, 200 yards, Lake City No. 13, Dunkirk, 31 seconds; hub and hub, Erie Hose, of Salamanca, 21 seconds.

League of California Municipalities.

—The twelfth annual convention of the League will be held in Santa Cruz Tuesday, September 21 to Friday, September 24, inclusive. Judging by the official program, which has been prepared, the sessions of the League this year will take on a wider scope of activities than in the past and will cover a wide range of matters of vital interest in municipal management and civic upliftment. There will be present representative officials from nearly every municipality in the State of California. The convention, which will meet in I. O. O. F. Hall, will be opened by an address by Mayor A. K. Orr, of Visalia, president of the League, followed by a welcoming speech by Mayor T. W. Drullard, of Santa Cruz. After the reading of reports by the secretary, there will be a debate, "Government by the Commission Plan," participated in by Councilmen A. E. Dodson and G. A. Follett, of San Diego and Richmond, respectively, and Mayor Hodghead, of Berkeley. In the evening the delegates will be given a reception by the trustees of the Santa Cruz Public Library. Wednesday will be department day. In the department of engineers a variety of topics will be taken up and discussed, likewise in the departments of city attorneys and clerks and auditors. In the evening municipal ownership will be taken up by the entire body. City Attorney Percy V. Long, of San Francisco, will talk on "The Relation of Municipalities to Public Service Corporations." On Thursday morning there will be a joint session of the League and the California Public Health Association, when public health matters will be taken up. President David Starr Jordan, of Stanford University, will be among the speakers, discussing "The Strength of Being Clean as Applied to Cities." At the evening session, State Controller A. B. Nye will speak of "Growth of Public Expenditures," after which will follow the election of officers and selection of the next place of meeting. The principal feature of the closing day, Friday, will be a trip to the Santa Cruz big trees, where a barbecue will be served in the forest shade.

Louisiana State Firemen's Association.—The executive committee held a meeting at David Crockett Fire Company's Hall, Gretna, July 17, to hear the protest filed by Washington Fire Companies Nos. 1 and 3, of Baton Rouge, against Home Fire Company, of Lafayette, for violating the tournament rules by not having their hose team properly uniformed in the recent tournament, held at Lafayette. After discussion of both sides the executive committee decided that the matter was one which ought to be settled by the delegates at the convention, and referred same to the convention for final action. The protest has accomplished one good object, and that is to cause the executive committee to issue circulars to every volunteer fire company and individual member of the association requesting them to give the subject of tournament rules consideration and submit suggestions in writing to the secretary before Nov. 1, 1910, from which they will draft a new set of tournament rules, which in the future will prevent contention among hose teams entering the state firemen's tournament. Chief Hugh Waddell suggested that the circulars be printed as soon as possible, and that they be mailed to every fire company in the association. His suggestion was adopted by a unanimous vote and the committee then adjourned.

American Public Health Association—The Association will hold its thirty-eighth annual meeting in Milwaukee, Wis., September 5 to 9, next. Representatives from many of the National organizations working in the interest of the public health have been invited to be present and to discuss methods for the correlation of the work of such organizations, and for the co-operation with a view to increasing efficiency and economy. Sanitary engineering will occupy a conspicuous place on the program. This association is the oldest National sanitary organization in the United States. Its membership extends over the United States, the Dominion of Canada, Mexico and Cuba. Information concerning it can be obtained by addressing Dr. William C. Woodward, Secretary, Washington, D. C.

Civil Service Employees of the City of Rochester, N. Y.—Civil Service employees of Rochester held a meeting July 19 and effected a permanent organization with the following officers: President, John C. McNab; Vice-President, William S. Sullivan; Corresponding Secretary, Mrs. Margaret A. Lucy; Financial Secretary, William J. Burke; Treasurer, James Beasley. A Board of Governors will be elected at the next meeting. One member will be appointed from each of the departments. John R. Stenzel, state organizer for the state conference of civil service employees, which was held in Brooklyn July 4, addressed the meeting. There were more than 100 employees of the city present.

Calendar of Meetings

- August 2-5.
Iowa State Firemen's Association.—Tournament, Red Oak, Iowa.
- August 4-6.
Ohio State Fire Chiefs' Association.—Annual Convention, Toledo, O.
- August 8-13.
Western Pennsylvania Volunteer Firemen's Association.—Convention, Carnegie, Pa.
- August 10-11.
Vermont State Firemen's Association.—Convention and Tournament, Burlington, Vt.—E. D. Moore, Secretary, Bennington.
- August 10-12.
Upper Peninsula Firemen's Association.—Annual Tournament, Sault Ste. Marie, Mich.
- August 16-18.
Wisconsin Paid Firemen's Association.—Annual Convention, La Crosse, Wis.
- August 16-19.
Firemen's Association of the State of New York.—Thirty-eighth Annual Convention, Watertown, N. Y.—Thomas Horahan, Secretary, Frankfort, N. Y.
- August 17-20.
National Firemen's Association.—Thirtieth Annual Convention, Rochester, N. Y. Bert Fisher, Secretary, 3812 Wabash ave., Chicago, Ill.
- August 22.
New York State Fire Chiefs' Association.—Meeting and Banquet, Syracuse, N. Y.
- August 23-25.
League of Third-Class Cities of Pennsylvania.—Annual Convention, York, Pa.—Mayor Jacob E. Weaver, President, York, Pa.
- August 23-26.
League of American Municipalities.—Annual Convention, St. Paul, Minn.—John MacVicar, Secretary, City Hall, Des Moines, Ia.
- August 23-26.
International Association of Fire Engineers.—Annual Convention, Syracuse, N. Y.—James McFall, Secretary, Roanoke, Va.
- August 24-26.
Virginia State Firemen's Convention.—Alexandria, Va.—G. C. Cummings, Secretary, Portsmouth, Va.
- September 5.
Greene County Firemen's Association.—Twenty-second Annual Convention, Tannersville, N. Y.
- September 5.
Rhode Island State Firemen's League.—Annual Muster, Manville, R. I.

September 5-9.

American Public Health Association.—Annual Meeting, Milwaukee, Wis.—W. C. Woodward, Secretary, Washington, D. C.

September 6-8.

Association of Edison Illuminating Companies.—Annual Meeting, Thousand Islands, N. Y.—Walter Neumuller, Assistant Secretary, 55 Duane st., New York, N. Y.

September 6-9.

Pacific Coast Association of Fire Chiefs.—Eighteenth Annual Convention, Stockton, Cal.—A. A. Sumner, Secretary, Anacortes, Wash.

September 6-9.

International Association of Municipal Electricians.—Fifteenth Annual Convention, Convention Hall, Rochester, N. Y.—Frank P. Foster, Secretary, Corning, N. Y.

September 8-12.

Michigan Gas Association.—Annual Meeting on Steamer sailing from Detroit, Mich.—Glenn R. Chamberlain, Secretary, Grand Rapids Gas Light Co., Grand Rapids, Mich.

September 14-16.

League of Michigan Municipalities.—Annual Convention, Lansing, Mich.

September 20-22.

Central States Water Works Association.—Convention, Indianapolis, Ind.

September 21-23.

Colorado Electric Light, Power and Railway Association.—Annual Convention, Colorado Springs, Col.—J. C. Lawler, Secretary, P. O. Box 938, Colorado Springs, Col.

September 21-23.

New England Water Works Association.—Annual Meeting, Rochester, N. Y.—Willard Kent, Secretary, Narragansett Pier, R. I.

September 21-23.

Massachusetts State Firemen's Association.—Thirty-first Annual Convention, Lowell, Mass.

September 26-30.

National Irrigation Congress.—Annual Meeting, Pueblo, Col.—Arthur Hooker, Secretary, Pueblo, Col.

October 10-11.

Massachusetts Police Association.—Annual Convention, Holyoke, Mass.

October 10-14.

American Street and Interurban Railway Association.—Annual Convention, Niagara Falls, Ontario.—H. C. Donecker, Secretary, 29 West 39th st., New York, N. Y.

October 11-16.

American Society of Municipal Improvements.—Seventeenth Annual Convention, Erie, Pa.—A. Prescott Folwell, Secretary, 239 W. 39th St., New York, N. Y.

November 14-18.

National Municipal League.—Annual Meeting, Buffalo, N. Y. Clinton Rogers Woodruff, Secretary, North American Building, Philadelphia, Pa.

PERSONALS

ADAMS, FRANCIS E., associated with the Coffin Valve Company, of Boston, Mass., for nearly 20 years, has severed his connection with this company.

ARMSTRONG, CHARLES G., has been appointed consulting engineer for the 25-story municipal building now being built in New York City under the direction of the Department of Bridges. Mr. Armstrong was consulting engineer for the equipment of the United States Express Building, and of the 46-story Singer Building.

ASH, LOUIS R., Kansas City, Mo., has been appointed City Engineer by the Board of Public Works of Kansas City, Mo., to succeed James L. Darnell. Mr. Ash has for several years past been employed in the office of Ira G. Hedrick, consulting engineer of Kansas City. Mr. Darnell will probably engage in practice as a consulting municipal engineer in Kansas City.

BATES, ONWARD, past president of the American Society of Civil Engineers, has been made a trustee of the Chicago Bureau of Public Efficiency, a semi-public body which has been appointed by the City Club of Chicago to assume charge of a fund of over \$100,000 raised privately for the purpose of investigating public affairs and to follow up the work of the

commission on city expenditures, which will soon go out of existence.

BETTS, PHILANDER, M. Am. Inst. C. E., a consulting engineer, of Washington, D. C., and formerly Assistant Professor of Electrical Engineering at George Washington University, has been appointed Chief Inspector of the utilities division of the New Jersey Public Utilities Commission at a salary of \$4,000.

BINCKLEY, GEORGE SYDNEY, who has been connected with the British Columbia Electric Railway Company, Ltd., as consulting engineer and chief hydraulic engineer for nearly two years past, expects to conclude his work in British Columbia in September, and resume his consulting practice in Los Angeles.

BOARDMAN, WILLIAM H., has been appointed consulting hydraulic engineer by the water committee of the City Council of Camden, N. J., and will prepare plans and specifications for the proposed auxiliary water supply for commercial and manufacturing purposes, as well as for additional fire protection.

BULL, DR. CLAY, Muncie, Ind., has been appointed Deputy County Health Officer, succeeding Dr. Howard Drumm.

COBB, S. P., A. E. Hibner and John N. French have resigned from positions as associate engineers with the Rochester Railway & Light Company. Mr. Cobb has accepted a position with the Albany Southern Railroad. Mr. Hibner and Mr. French will inaugurate a department of consulting engineers with the Toronto Electric Light Company, with headquarters in that city.

DAMON, ALBERT F., civil engineer, of Darby, Pa., has been appointed Consulting Engineer of Chester and West Chester, Pa. Mr. Damon succeeds the late Silas G. Comfort.

HANSEN, PAUL, Columbus, O., Acting Chief Engineer, Ohio State Board of Health, has resigned to accept the position of Chief Engineer of the Kentucky State Board of Health.

JONES, DEE, Alexandria, Ind., has been appointed City Attorney, succeeding B. H. Ball.

LUMSDEN, L. L., has been detailed by the Public Health and Marine Hospital Service to make an extensive study of typhoid fever in Chicago.

MILLER, EUGENE B., Owensboro, Ky., has been elected City Clerk.

MULLEN, CHARLES A., New York, N. Y., has been appointed Superintendent of Street Construction, Department of Public Works, Milwaukee, Wis. Mr. Mullen is 28 years old and a member of the Socialist party. Mr. Mullen is a member of a family which has been prominent in the construction department of the Barber Asphalt Paving Company since its organization.

NERNEY, JOHN H., Chief of Police, Taunton, Mass., has resigned. He was recently appointed probation officer and prefers to fill that office.

PECK, GEORGE W., of the Pelton Water Wheel Company, has been appointed Mechanical Engineer for the Water Department of St. Louis, Mo.

RYAN, JOHN F., District Chief of the Fire Department of Boston, Mass., died last week after 30 years' service, aged 58 years.

TUPPER, C. A., formerly manager of the publication department of the Allis-Chalmers Company, has become manager of the Reliance Engineering & Equipment Company, of Milwaukee, Wis.

WHITE, WILLIAM P., Mayor of Lawrence, Mass., has resigned. Mayor White is serving a three-year sentence for bribery. He maintains that he is not guilty and expresses the hope that he will be able to establish his innocence.

TRADE NOTES

Cast-Iron Pipe.—Chicago: Current prices are maintained on routine business but shaded on large orders. Quotations: 4-inch, \$28; 6 to 12-inch, \$27; 16-inch and up, \$26. Birmingham: Business is quiet and a large plant in the district will be closed. Quotations: 4 to 6-inch, \$23; 8 to 22-inch, \$12; over 12-inch, average, \$21. New York: Demand is exceedingly quiet. Quotations: 6-inch, \$23.50 to \$24.

Lead.—Market is firmer and prices tend upward. Quotations: New York, 4.40c. to 4.45c. St. Louis, 4.25c.

Boilers.—The Heine Safety Boiler Company, St. Louis, reports an excellent demand for its safety boiler, which is coming from a territory embraced by both coasts and is taxing the large facilities of the new plant.

Pumps.—F. E. Myers & Bro., Ashland, O., pump makers, have bought a tract adjoining their present site and will shortly begin the erection of a new foundry. Owing to the growth of the company's business their foundry capacity has been inadequate for some time and outside foundries have been furnishing some of the castings. Plans for the new foundry have not yet been prepared. It is the intention to build a plant that will employ 75 additional workmen.

Quarry Machinery.—A crushing plant and cut stone works, equipped with modern machinery, will be installed by the Ohio Oolitic Stone Company, recently organized with headquarters at Bloomington, Ind., the president of which is Wm. W. Dodgson, Dayton, O. A new quarry will be opened and equipped by fall. The machinery will include apparatus for the production and application of both pneumatic and electric power.

Conveying Machinery.—The Jeffrey Mfg. Company, Columbus, O., has changed the location of its Denver office from 1711 Tremont place to a commodious suite of rooms in the First National Bank Building. This company, besides maintaining a large selling force in over a dozen of the leading cities of this country, maintains a corps of engineers at its branch offices situated in the following cities: Chicago, St. Louis, Denver, Montreal, Pittsburgh, Charleston, W. Va.; Boston, New York and Birmingham. There are also nearly 100 Jeffrey agencies in additional cities in this country and abroad.

Gas Engines.—The Foos Gas Engine Company, Springfield, O., is operating its plant with full day and night shifts in order to keep up with bookings, prompt deliveries having been one of the chief factors in building up its present large trade.

Stokers.—The Green Engineering Company, which has a district office in St. Paul, Minn., is introducing its chain grate stokers quite extensively through the Northwest, many owners of power plants having adopted them on account of the operating economy which they make possible.

Pumping Engines.—The Geo. E. Dow Pumping Engine Company, whose plant is in Alameda, Cal., has moved its San Francisco offices from First and Howard streets to the Sheldon Building, First and Market streets. The company has booked orders for two complete surface condensing plants for the Japanese Government. It is also installing an electrically driven pump of 3,000,000 gal. per daily capacity for the city water works of Marysville, Cal.

Street Oiling.—The Edward Balf Company, Hartford, Conn., contractor for street cleaning, sprinkling, etc., foreseeing that oil and similar preparations were to become important factors in the treatment of streets, made a scientific study of the subject early and only recently it purchased several wagons of the latest type for oil distribution. It also has about every sort of oil or kindred compound designed for the purpose, at least all that have proven feasible, and is now in a position to conduct experiments for municipalities or private individuals anywhere in the state. Many experiments are already being made throughout the city by the company, and others are in progress in different parts of the state. Owing to the excellent equipment possessed by the company and its expert knowledge of the subject, the experiments are producing very gratifying results, and it takes but comparatively little time to tell just what particular sort of treatment is going to give the best results in any given case. The company offers to put at the disposal of officials or individuals interested the information it has collected on the subject.

Windmills.—Commercial Agent James D. Whipple, Buenos Aires, writes that the use of windmills for pumping water has increased greatly in the last five years and is likely to increase indefinitely. Half a dozen firms in the United States control the trade. Government figures of windmill imports are by weight only, but it is estimated by dealers that about 1,000 windmills enter the country every month. The size of machines used vary from wheels 6 to 16 feet in diameter—the former developing $\frac{1}{2}$ horsepower and the latter three horsepower. Towers, which must be simple and strong, are sold with the windmill.

Plant Enlarged.—The C. O. Bartlett & Snow Co., Cleveland, Ohio, manufacturers of dryers, garbage reduction machinery, etc., have recently leased additional property on Columbus street, near the present works. This is a manufacturing plant having about 76,000 sq. ft. of floor space with a complete power plant and railroad facilities. New machinery has been installed and the company will start operations in the new plant at once.

Excavating Machinery.—The American Hoist & Derrick Company, St. Paul, Minn., will erect a building of steel construction 90 x 200 ft. for fabrication steel work. It will be equipped with electrically operated machinery which will be moved into the new building from other departments.

Diaphragm Pumps.—The Goulds Mfg. Company, Seneca Falls, N. Y., through its district representatives in New Orleans, is placing a large number of diaphragm suction pumps, both for power and hand operation, with contractors all through the lower tier of Southern States, where a great deal of dewatering needs to be done in connection with work now under way.

Wheel Scrapers.—Clapp, Nordstrom & Riley, Chicago, Ill., representatives of the Davenport Locomotive Works and the Western Wheel Scraper Company, have purchased a tract of land at Clyde, Ill., which they are fitting up for handling the implements which they carry in stock. A shop, 60 x 100 ft., is being erected which will be used for repairs.

Crushing Plant.—The Ransome-Crummy Company has leased two rock quarries at Klamath Falls, Ore., where a large crushing plant will be installed.

Pumps.—The Canton-Hughes Pump Company, Canton, O., announces that it will build a new plant at Wooster, O., which will double its present output. Owing to the growth of its business the company finds its present factory capacity entirely inadequate. In addition to requiring more room the company feels the need of a type of plant somewhat different from its present one because of the larger work that it is building each year. At present it has contracts for high duty pumping engines weighing from 200,000 to 300,000 lbs. The new plant will be equipped for taking care of not only the smaller work, but more particularly the heavier class of work. Plans for the new plant have not been completed, but it is the intention to build a plant that will furnish employment for 300 men. To secure the plant for that city, the Wooster Board of Trade agrees to furnish a 5-acre site and give the company a bonus of \$30,000. The present plant at Canton will be retained. As Wooster is but 32 miles from Canton, the company expects no inconvenience in the operation of the two plants. The Canton-Hughes Company reports that it is receiving orders from a very extended field, a good volume of foreign business coming from the trade enters of Europe and from China, Japan, Australia, South Africa and the Philippines.

Welfare Work.—On July 19 Keuffel & Esser Company, Hoboken, N. J., celebrated the forty-third anniversary of the founding of the house by a banquet to their employees at Grand View Park, Jersey City Heights. Interest was added to the occasion by the fact that four employees this year completed their twenty-fifth year of service with the company. Appropriate gifts were presented to them by the firm and by their fellow workmen. Twelve employees who have completed a quarter century or more with the company occupied places of honor with the officers of the company.

Steel Supplies.—Joseph T. Ryerson & Son announce the removal of their New York office to the seventh floor of the Hudson Terminal Building, 30 Church street, New York City, and the maintenance in connection therewith of machinery display rooms and warehouses immediately adjacent to the Jersey City terminal of the Hudson and Manhattan tunnel. In addition to a complete stock of boiler, structural and machine shop specialties and fittings, Morison corrugated furnaces, Glyco bearing metal, tool steel, metal working shop supplies and equipment, including both hand and power tools, their increased facilities will permit of immediate shipment from stock of staple lines of iron and steel, including structural shapes, universal plates, etc. In keeping with the establishment with eastern warehousing facilities and machinery display and demonstration rooms, the personnel of the New York office will be increased sufficiently to insure the same careful attention to and consideration of their eastern trade that has attended their development elsewhere. Customers located in the territory served by the New York office will save considerable time by sending all orders and correspondence direct to Joseph T. Ryerson & Son, 30 Church street, New York.

Gas Engines.—The customs foundry department of the Dean Gas Engine & Foundry Co. is very busy, and the company reports a rapidly increasing demand for Fox four-port two-cycle gasoline motors, of which it is the patentee and manufacturer.

MUNICIPAL APPLIANCES

Concrete Spreaders

Two interesting labor-saving devices for use in concrete laying are made by the Briggs Labor Saving Specialty Co., Waterloo, Ia., namely, a horse drawn concrete spreader and a hand concrete spreader. Both are shown in the illustrations. The horse drawn spreader consists of an iron cart body mounted on two wheels. A door at the bottom discharges the concrete, and, with the aid of the motion of the cart, spreads



BRIGGS CONCRETE SPREADING HAND CART

it. It is suited for use where concrete is placed in layers in situations accessible to horses, as in paving a street. In this case the concrete would preferably be mixed by machine at a convenient intersection, delivered into the cart, which is low enough to pass under the chute of an ordinary mixer, and hauled to the face of the work in the street where it is dumped exactly where wanted. The convenience of this method in doing away with planks, etc., and in not obstructing the street is obvious. Its chief claim, however, is as a labor-saving device.

The hand spreader is made and operated on similar principles. In this machine the wheel base, center to center of tires, is 35 inches. Diameter of wheels, 32 inches; height from ground to top of bed, 30 inches. It is specially designed for strength. The hub has removable steel box, six inches in length, for 1 1/4-inch axle. Axles are

forged steel firmly fastened to sides of bed in such a manner as to insure strength and durability. Wheels have twelve well staggered half inch spokes in tension. Its weight is about 225 pounds. The cart is designed to be handled like a wheelbarrow. The handles are adjustable so that they may be changed almost instantly for a tall or short man to operate. On front end of cart is a pull handle for use when the road bed is rough and it is not possible for one man to push the loaded cart alone. The door is operated in a most simple manner, and can be dumped with the foot. It is closed and locked by lever passing its dead center. Turnbuckles enable the user to keep the door perfectly tight. The machine is suited for sidewalk and curb work and for discharging concrete into building forms. A more even mix is secured by the bottom dump feature than is possible to obtain from a cart or wheelbarrow that tips. The cart is easily handled with a hoist.

Rib Metal for Sewer Arches

Rib metal, the product of the Trussed Concrete Steel Company, Detroit, Mich., is claimed to be cheaper and more easily handled and placed as a reinforcement in sewer arches than twisted or square rods. One of the illustrations shows a sewer with rib metal in place, the other is a diagram indicating the proper position for the reinforcement. Rib metal consists of a series of straight ribs or main tension members, rigidly connected by light cross ties formed from the same sheet of steel. The cross ties accurately space and thoroughly anchor the main ribs in the con-

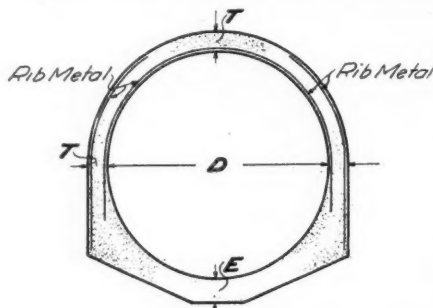
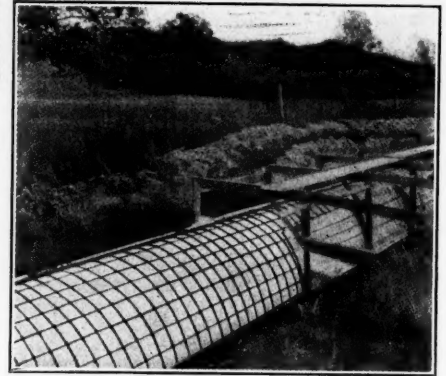


DIAGRAM REINFORCED CONCRETE SEWER



CONCRETE SEWER—STEEL RIB METAL REINFORCEMENT

crete, providing an excellent cross reinforcement against temperature and shrinkage strains. Rib metal is stiff and rigid, not pliable and wirey. It reaches the job ready to be placed in concrete. There is no field labor required to unroll and straighten coils into flat sheets. Regarding the quality of the steel used the manufacturers make the following claims:

"Medium open hearth steel—as used in Rib Metal—is the best quality steel for reinforcement. High carbon and high elastic limit steel, showing individual tests of greater ultimate strength, are unreliable owing to their brittleness and lack of uniformity. Further, the correct design of reinforced concrete is governed not by the elastic limit of the steel, but by the maximum allowable stretch in the concrete—1/1000 of its length. This is equivalent to a stress of 30,000 pounds per square inch in the steel, or less than the elastic limit of medium steel. The modulus of elasticity of both medium and high carbon steels is the same:—equal sized bars will stretch the same amount under the same load. Nothing can possibly be gained by using a high elastic limit or high carbon steel. The area of the reinforcement is what counts."

Loading Wagon by Bucket

One of the severest strains to which a dump wagon can be put is loading with a steam shovel. The illustration shows a loaded bucket in the act of discharging a full cubic yard of dirt into a Studebaker dump wagon from a height of fully eight feet. The excavating is being done in Navarre Place, South Bend, Ind., by H. W. Reed & Sons.



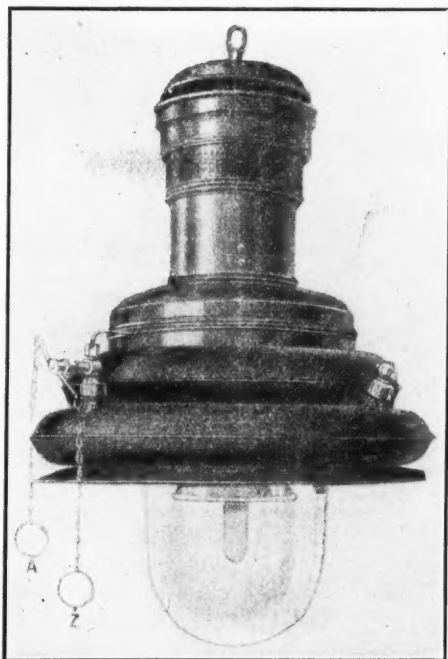
BRIGGS CONCRETE SPREADING CART LAYING FOUNDATION FOR PAVEMENT



LOADING WAGON FROM BUCKET

Petroleum Inverted Arc Light

THE Feneka lamp is a petroleum inverted light suitable for outdoor lighting made by the Deutsche Gasgluelich Aktiengesellschaft, Berlin, Germany, Rotherstrasse 8-12. It is claimed to have a lighting efficiency of about 800 candle power and to burn from 18 to 20 hours with one filling. The lamp consists of the lamp casing, the containers for air and petroleum, the vaporiser, and the burner. The lower compartment is filled with petroleum, while the upper serves as air chamber and is placed under a pressure of about 3 atmospheres by means of a small pump. To start the gasification it is necessary to pre-heat the burner. For this purpose the cup surrounding the burner is filled with methylated spirit from the outside. The spirit is then lighted and heats the vaporiser and burner; after 2 minutes the petroleum valve is opened. The petroleum which enters the vaporiser is gasified by the spirit flame and thereupon ignites. After the spirit is burnt out the gasification is effected by the heat of the

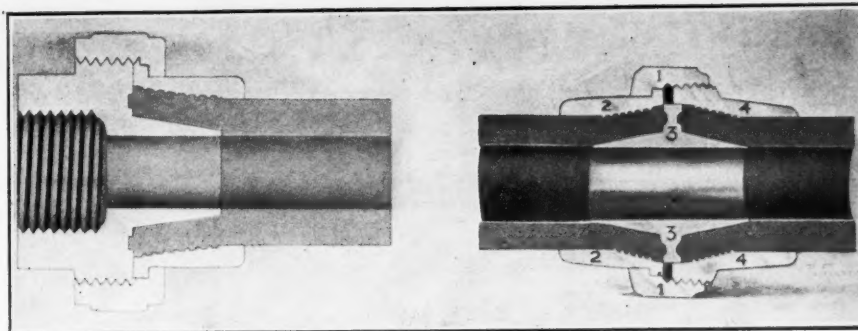


PETROLEUM ARC LAMP

burner itself. The casing of the lamp can be easily raised, thus exposing the inner parts, which are protected by the casing when down. The lamp can be shut off by closing the petroleum valve, when it will only burn as long as there is petrol gas in the vaporiser. The burner and the vaporiser can be easily taken out for cleaning. A special advantage of this lamp is that the pin for cleaning the nozzle is fixed to the nozzle itself and can be used at any time, even when the lamp is burning, simply by turning the lever, located outside.

General Purpose Dump Wagon

THE best wagon for a municipality to own is the one that will most nearly meet all requirements and do the work in the least possible time with a minimum of expense or annoyance; one suitable for hauling street building or repair materials, street cleanings, sweepings, ashes, snow, etc. The Troy dump wagon shown, made by the Troy Wagon Works, Troy, O., is claimed to be specially adapted for such purposes. It is made with top section of box hinged to avoid high shoveling or lift-



Lead to iron coupling
SECTIONAL VIEW, CORCORAN LEAD PIPE COUPLING

ing, the total height being about 5 ft. 11 in. and to hinged section 5 ft. 5 in. Capacity is $2\frac{1}{2}$ cubic yards or 8,500 pounds. Body is rock maple with bottom of reinforced steel plates that will hold all of the load until driver releases the dumping device, and will discharge the load without requiring the team to stop. The springs over rear axle absorb shock and relieve strain on both body and wheels, thus increasing the life of wagon. It is equipped with spring seat, tubular steel whiffletrees and either tongue chains, neck yoke or Boston backers.

Lead Pipe Coupling

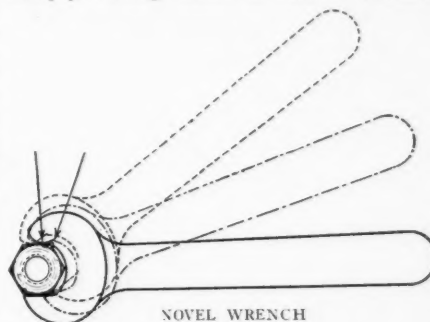
A BRASS coupling, by means of which two lead pipes may be joined, or a lead pipe joined to an iron pipe, without the usual wiped joint, has been placed on the market by the Allyne Brass Foundry Company, Detroit, Mich., under the trade name of Corcoran Lead Pipe Coupling. The plumber, his furnace and tools are unnecessary and all that is needed is a wrench. The coupling consists of an overall nut, an outside sleeve with flange, inside or union walls and outside sleeve with thread. The overall nut draws the two sleeves together over the inside or union wall. The illustration shows the Corcoran Lead Pipe Coupling in sectional view. 1. Shows the overall nut holding the various parts in close union. 2. Outside sleeve, with flange. Note the grip upon the lead pipe. 3. Inside or union walls. Note how the washer is formed—the pipe ends are drawn together by being gripped by the inner grooves on sleeves 2 and 4, and swaged into the channels in union 3, thereby forming its own washer. 4. The second sleeve has threads without and grooves within—the overall nut making a secure union of the parts of the sleeve with the lead pipe. 5. Lead pipe.

Of special interest to municipal au-

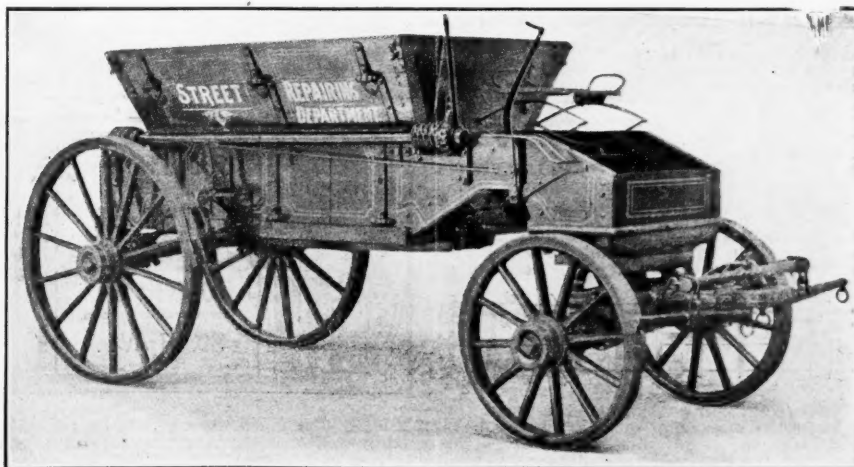
thorities is the application of this invention to corporation and curb cocks. The company manufactures these appliances for use in connection with the Corcoran coupling in all required sizes.

Ratchetless Ratchet Wrench

A WRENCH that can be used in the same way as a ratchet wrench, yet has no ratchet mechanism has been invented and placed on the market by J. H. Williams & Co., Brooklyn, N. Y. As shown in the diagram, the heel of the ordinary following jaw is cut away. The advantage of the modification comes in when the wrench is on its idle stroke, for, instead of retracting it from the flats of the nut after the manner of an ordinary solid wrench, the handle is simply swung back as with a ratchet



wrench, and the short jaw rolls on the flat with which it is in contact, releasing the other jaw from the opposite flat. Further movement of the handle attended with slight pressure toward the nut allows the short jaw to slide as soon as the nick at its base is free. When the long jaw comes in contact with the next flat of the nut the short jaw hooks the corner diametrically opposite the one in contact with the joint of the long jaw and a reverse rotation of the handle causes the nut to turn.

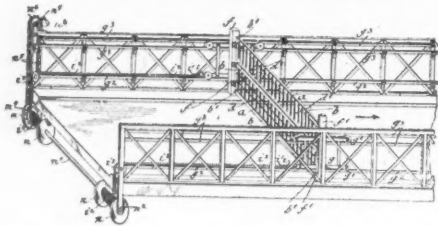


GENERAL PURPOSE MUNICIPAL WAGON—HINGED SIDEBOARD FOR EASE IN LOADING

PATENT CLAIMS

963,433. SAFETY DEVICE FOR PREVENTING RUNAWAY ACCIDENTS ON BRIDGES. Max Goodman, New York, N. Y. Serial No. 526,738.

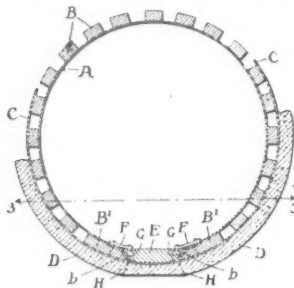
A safety gate for preventing runaway accidents on bridges, which comprises a gate corresponding to the width of the roadway of the bridge, gate-posts for the



same, a hinge-connection between the safety gate and one of the gate-posts, means for locking the opposite end of the gate to the opposite gate posts, ways on the side-railings of the bridge structure, roller-carriages attached to the gate-posts and guided on said ways, and means connected with said roller-carriages for returning the safety gate to its initial or starting position after it has been moved forward on the roadway of the bridge.

963,544. FORM FOR CONCRETE CONDUIT CONSTRUCTION. Francis Savier Graef, New York, N. Y. Serial No. 519,063.

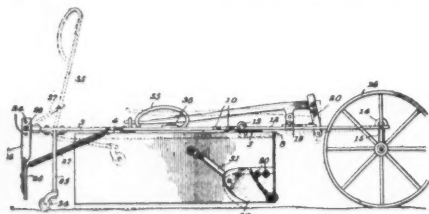
An expandible cone form for molding tubular structures, consisting of a series of transverse expandible flexible ribs having



the proper contour, a series of separated longitudinal strips secured to said flexible ribs and having end strips provided with inward beveled edges, a bevel-edge removable spreader widening inward to correspond with the end strips, fastening turn-buttons attached to the end strips, and a sheet metal covering on the longitudinal strips constituting the outside of the form.

963,963. ROAD SCRAPER AND GRADER. Joseph Van Matre, Newcastle, Ind. Serial No. 505,059.

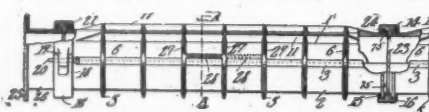
In a road scraper and grader, the combination with a frame, a pair of scraper plates mounted on said frame each extend-



ing at an angle to the longitudinal axis of the frame with the angles opening toward the front thereof, and segmental plates connecting the frame and scraper blades and having adjustable connection with said scraper blades whereby the angle of said scrapers may be adjusted.

964,585. CULVERT CONSTRUCTION. Charles Traub and John William Helfrecht, Galetton, Pa. Serial No. 556,499.

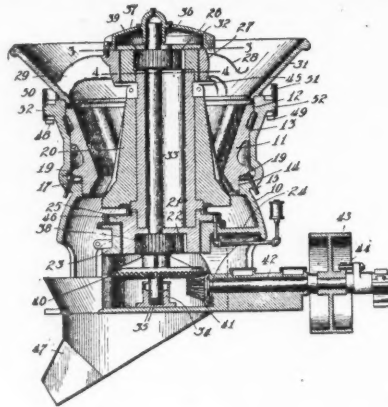
A two-part culvert, one part of which is provided along its edges with outstanding tongues within which the edges of the other part are adapted to be received, there being



transverse aligning ribs upon the parts, the ends of the ribs upon one part being beveled, and the ends of the ribs upon the other part being correspondingly beveled to extend beyond the meeting edges of the parts.

964,183. ROCK-CRUSHER. De Witt C. Prescott, Chicago, Ill. Serial No. 488,715.

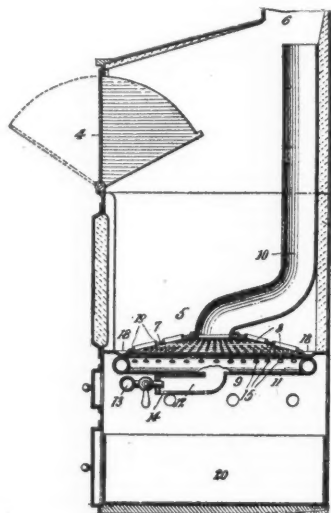
In a rock crusher, in combination, a shell, a mortar within the shell, a driving shaft on the axis of the mortar, a pair of inter-



nal gears loosely encircling the shaft one above and the other below the mortar, such gears having eccentric sockets in their contiguous faces, a hollow spindle having its ends seated in the eccentric sockets, a conical crusher head mounted on the spindle, a pair of spur gears fixed on the shaft and meshing with the internal gears, and means for driving the shaft.

964,568. GARBAGE CREMATORY. Oscar M. Shannon, New Rochelle, N. Y. Serial No. 493,113.

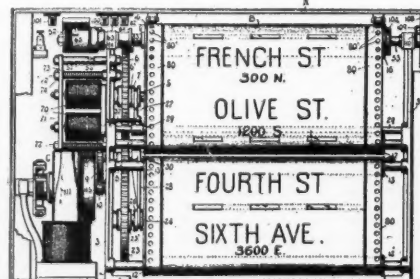
In a garbage crematory, a chamber adapted to receive garbage, a grate at the bottom of said chamber, an exit flue communicating with the space below the grate, and



a gas burner having jets impinging against the grate at points remote from the exit flue, whereby the flame and products of combustion travel across the under face of the grate in direct contact therewith.

964,835. STREET OR STATION INDICATOR. Herman Alwies, St. Louis, Mo. Serial No. 529,875.

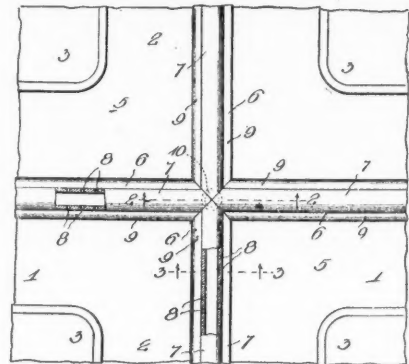
An indicator comprising a winding spool, a supply spool, a sign sheet mounted on said spools, a shaft rotatable in unison with said sign sheet, a revolvable switch, a spring yieldingly connecting said switch directly



to said shaft, an electric motor for operating said members, said motor being controlled by the revolvable switch, and a movable stop retaining said switch in its normal position.

965,077. STREET-SPRINKLING SYSTEM. James H. Carmack, Oklahoma, Okla., assignor of one-half to Cleveland L. Rose, Oklahoma, Okla. Serial No. 530,423.

In a street sprinkling system, a series of pipes set in the street pavement and having respective extensions projecting above the surface of the street, said extensions having



vertically disposed side walls with series of water discharging perforations therein, and means for preventing the pipes from being pressed down below the surface of the street.

INCORPORATIONS

American Gas Company, Chicago, Ill.; operate a heat, light and power plant; capital, \$200,000. Incorporators: Frank M. Campbell, Wm. A. Carlin, Herbert A. Nichols.

Armor Concrete Construction Company, Boston, Mass.; engineering and construction work; capital, \$30,000. Incorporators: Pres. Harry J. Osborne, Dorchester; Treas. Edgar W. Osborne, Somerville; Clerk, W. F. Borhek, 60 State St., Boston.

Birmingham Slag Company, Birmingham, Ala.; slag bricks. Incorporators: Solon Jacobs, president, and others.

Birmingham Chert Company, Birmingham, Ala.; Joe R. Cook, W. J. Conniff and others.

Carpenter Concrete Company, Petersburg, Va.; contracting; capital, \$10,000. Incorporators: C. H. Carpenter, president; James I. Joyner, secretary-treasurer.

Duke Heating & Water Company, Richmond, Va.; water systems; capital, \$25,000. Incorporators: T. W. Duke, president; H. S. Rucker, secretary-treasurer.

Gardner Crusher Company, James M. Satterfield, Dover, Del.; capital, \$1,000,000. Incorporators: Frank Gardner, Paris, France; William B. Hord, New York City; James M. Satterfield, Dover, Del.

Granville Supply Company, St. Louis, Mo.; capital, \$10,000. Incorporators: William A. Granville, John Granville and others.

The Illinois Cast Iron Pipe & Foundry Company, Chicago, Ill.; Incorporators: A. M. Ozburn, W. M. Umbdenstock and A. G. Bower.

Jacobs Engineering Company, Ottawa, Ill.; engineering and contracting; capital, \$30,000. Incorporators: W. F. Jacobs, Chas. C. Jacobs, W. C. MacFarlane.

Kent Water, Light & Power Company, Wyoming, Del.; capital, \$25,000. Incorporators: Hugh T. Downing, Webster N. Maas, Harry T. Shelley, all of Philadelphia, Pa.

Langhorne & Ballard Company, Lynchburg, Va.; contracting; capital, \$175,000. Incorporators: C. D. Langhorne, president, Greenwood, Va.; E. K. Langhorne, vice-president, Maneto, Va.; J. D. Ballard, manager, Bedford City, Va.; F. H. Herring, secretary, Greenwood, Va.

Lock Bar Steel Concrete Company, Chicago, Ill.; manufacture steel and iron construction work; capital, \$50,000. Incorporators: Chas. F. Rathbun, R. M. Ashcraft, E. M. Ashcraft, Jr.

Mackey Water Motor Pump Co., Silver Creek, N. Y.; manufacture automatic water pumps; capital, \$50,000.

The Morrilton Light & Power Co., Morrilton, Ark.; to manufacture and sell electric light and power at Morrilton; capital, \$20,000. Incorporators: Wm. L. Moose and G. H. Burr.

The Pay-As-You-Enter Car Corporation; Registrar & Transfer Co., Wilmington, Del.; capital, \$5,000,000. Incorporators: Chas. F. Fox, William G. Taylor, Harry W. Davis, all of Wilmington, Del.

Reliance Construction Company, Chicago; contract and construction work; capital, \$10,000. Incorporators: Henry M. Seligman, F. L. Brooks, M. S. Murphey.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Concrete Work—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREET IMPROVEMENTS				
Alabama.....	Ft. Morgan.....	Aug. 5, 1:30 p.m.	Bldg. brick paved road and cement walks.....	Lt. E. F. Bartow, Constr. Q. M.
Georgia.....	Clarksville.....	Aug. 5, 8 p.m.	Bldg. 9,000 sq. yds. brick or cement walks, 8,000 sq. yds. macadam paving, 6,000 lin. ft. conc. curb and gutter.....	J. H. Hicks, Mayor.
Indiana.....	East Chicago.....	Aug. 5.....	Improving 5 streets; costs \$43,571, \$27,533, \$49,921, \$31,385 and \$43,571; also 20 miles cement sidewalk.....	C. K. Wallace, City Engineer. City Commissioners.
Kansas.....	Ft. Scott.....	Aug. 5.....	Bldg. 22 miles of Kansas City-Ft. Scott road.....	F. Wilson, County Engineer.
Indiana.....	Marion.....	Aug. 5.....	Improving 2 miles of roads.....	Fred Dreihls, Clk. Co. Comrs.
Ohio.....	Cincinnati.....	Aug. 5, noon.....	Improving extension of Struble road, Co. & Springfield twps.	J. H. McConnell, County Auditor.
Ohio.....	Canton.....	Aug. 5, 10 a.m.	Brick paving, grading, draining, 2.54 miles, Sugar Creek twp.	Clifton Sipe, County Auditor.
Ohio.....	Mt. Gilead.....	Aug. 5, 11 a.m.	Improving Gilead Road No. 3.....	John G. Pease, City Clerk.
Kansas.....	Junction City.....	Aug. 5, 3 p.m.	Bldg. cement sidewalks in E. 8th and W. Chestnut streets.....	
New Hampshire.....	Concord.....	Aug. 5, 1 p.m.	Bldg. 10,000 ft. trap rock road at Somersworth, also \$1300 gravel road in Lee.....	H. C. Hill, State Engineer.
Ohio.....	Cincinnati.....	Aug. 5, noon.....	Brick and macadam paving, cement curb, brick gutters, grading, etc., Tafel st.; bond, \$1,200.....	John J. Wenner, Clk. Dir. Pub. Serv.
Pennsylvania.....	Turtle Creek.....	Aug. 5.....	Brick paving, curbing, etc., Monroeville road.....	Wilson L. Wright, Sec'y of Council.
Illinois.....	Kankakee.....	Aug. 5, 4 p.m.	Sarco macadam paving, Court st. from Chicago to Taylor.....	Robt. D. Gregg, City Engineer.
Indiana.....	Hammond.....	Aug. 5, 10 a.m.	Paving, curb, gutter, etc., May street.....	A. R. Ebert, Pres. Bd. Pub. Works.
Indiana.....	Connersville.....	Aug. 5.....	Bldg. gravel and concrete walks, also cement curb and gutter.....	C. Ridpath, City Engineer.
Washington.....	Seattle.....	Aug. 5, 10 a.m.	Grading and regrading sundry streets.....	C. B. Bagley, Sec'y Bd. Pub. Works.
Ohio.....	New Lexington.....	Aug. 6, noon.....	Grading, curbing, paving, etc., Town Hall alley and School ave.	Harry J. Stalter, Village Clerk.
Pennsylvania.....	Scranton.....	Aug. 6, 11 a.m.	Asphalt paving on concrete base, 6 streets and avenues.....	C. V. Terwilliger, Dir. Pub. Works.
Oklahoma.....	El Reno.....	Aug. 6.....	Paving, curbing, etc., Bickford ave., in Hickox addition.....	The Mayor.
Pennsylvania.....	Tarentum.....	Aug. 6, 4 p.m.	Paving, 5,000 sq. yds.; curb, 5,800 lin. ft.; excav., 4,230 yds.	W. A. Gibson, Borough Secretary.
Indiana.....	Washington.....	Aug. 6, 10 a.m.	Bldg. Prather gravel road in Washington township.....	Thos. Nugent, County Auditor.
Ohio.....	Richwood.....	Aug. 6, noon.....	Vit. brick or asphalt block paving Franklin st., 26 ft. wide, bldg. retaining walls, curbs, grading and excavating.....	Roy L. Jordan, Village Clerk.
Indiana.....	Frankfort.....	Aug. 6, 2 p.m.	Bldg. 15 gravel roads, postponement from July 9.....	C. F. Cromwell, County Auditor.
Wisconsin.....	Antigo.....	Aug. 6, 2 p.m.	Paving with macadam, 4 city blocks.....	G. O. Palmeter, City Clerk.
Louisiana.....	Alexandria.....	Aug. 6.....	Brick paving Gould ave., 11th to Levin sts., gravel on to city line	I. W. Sylvester, City Engineer.
Indiana.....	Indianapolis.....	Aug. 6, 10 a.m.	Repairs to Cumberland gravel road; bldg. 7 culverts.....	Albert Sahn, County Auditor.
Indiana.....	Tipton.....	Aug. 6.....	Bldg. 5 gravel, stone or macadam roads, 20,234 ft. long; \$12,846	Board of County Commissioners.
Tennessee.....	Chattanooga.....	Aug. 6, 2 p.m.	Macadam asphalt roadway, concrete curb and gutter, Rossville road; \$15,000 bond for roadway, \$5,000 for concrete curb, etc.	W. L. Dodds, County Engineer.
Michigan.....	South Haven.....	Aug. 8, 5 p.m.	Macadamizing 10,000 sq. yds., Broadway.....	Arthur Ryall, City Clerk.
Nebraska.....	Omaha.....	Aug. 8, 2 p.m.	Grading Camden ave. from 25th ave. to 27th st.	Geo. L. Campen, Asst. City Engr.
Nebraska.....	Norfolk.....	Aug. 8, 5 p.m.	Paving 23,256 sq. yds. any suitable material, etc.	P. J. Fuesler, Chm. Bd. Pub. Wks.
New York.....	New York.....	Aug. 8, 11 a.m.	Regulating, grading, curbing, sidewalks, etc.	Geo. McAneny, Borough President.
Iowa.....	Knoxville.....	Aug. 8.....	Concrete paving, 20,000 sq. yds.; Hall & Adams, Cent'ville, Eng.	City Clerk.
Indiana.....	Valparaiso.....	Aug. 8, noon.....	Bldg. 2 gravel roads in Center township.....	S. P. Corboy, County Auditor.
Illinois.....	Watseka.....	Aug. 8, 2 p.m.	Macadam and Tarvia X paving, comb. curb and gutter, etc.	Board of Local Improvements.
Virginia.....	Winchester.....	Aug. 8.....	Bldg. concrete sidewalks, etc., at Winchester Natl. Cemetery.	Capt. H. L. Pettus, Wash., D. C.
Alabama.....	Dothan.....	Aug. 8.....	Bldg. 12 miles of sidewalks, curb and gutter.....	S. C. Stallings, City Engineer.
Illinois.....	Cairo.....	Aug. 8, 8 p.m.	Paving Sycamore and Eighth streets.....	W. B. Thistlewood, City Engineer.
Missouri.....	Macon.....	Aug. 8, 8 p.m.	Paving Pearl st., from Lincoln to Seward st.	E. W. English, City Clerk.
Alabama.....	Decatur.....	Aug. 8, 10 a.m.	Grading, draining, macadamizing 4 roads.....	F. L. Gibboney, City Engineer.
Ohio.....	Akron.....	Aug. 8, 11 a.m.	Resurfacing 2 miles macadam road on West Market street.....	C. L. Wirth, Clk. Co. Comrs.
Illinois.....	Berwyn.....	Aug. 9, 8 p.m.	Bldg. concrete sidewalks in Maple ave. and other streets.....	Geo. H. Norton, Sec'y Bd. Loc. Imp.
Iowa.....	Clinton.....	Aug. 9, 8 p.m.	Creo, wood block paving, on 5-in. concrete, 1-in. sand filler, pitch cushion, 8,330 sq. yds.; concrete curb, 2,480; ft. 13 catch basins, new style; 640 ft. 10-in. pipe, 3 manholes, etc., Main st.	W. E. Hayes, City Clerk.
Ohio.....	Oakley.....	Aug. 9.....	Grading, macadamizing, etc., Cresap st. and Ebersole ave.	Oscar Kosche, Village Clerk.
New Jersey.....	Trenton.....	Aug. 9, 2:30 p.m.	Macadamizing, etc., Rocky Hill road, Princeton township.....	J. Mason Ege, Dir. Bd. Freeholders.
Alabama.....	Decatur.....	Aug. 9, 10 a.m.	Grade, drain, macadam, 4 roads, 5.5, 1.5, 3 and 4.5 miles long.	J. T. Bullen & R. P. Boyd, Co. Engrs.
Indiana.....	Winamac.....	Aug. 9.....	Improving 5 public highways.....	Ellis S. Rees, County Auditor.
California.....	Napa.....	Aug. 9.....	Macadamizing Secs. A, C and D, Browns Valley rd., 2 mi., \$6,500	Board of Supervisors.
Texas.....	Houston.....	Aug. 9, noon.....	Paving W. Montgomery road with gravel or shell.....	John B. Ashe, County Auditor.
Connecticut.....	Greenwich.....	Aug. 9, 5 p.m.	Brick, wood block or bitulithic paving, Putnam ave.	Warden and Board of Burgesses.
New York.....	Brooklyn.....	Aug. 10, 11 a.m.	Regulating, grading, paving, sidewalks, etc.	A. E. Steers, Boro. President.
Pennsylvania.....	Harrisburg.....	Aug. 10, 2 p.m.	Bldg. 5,030 ft. of road from Coraopolis & Carnot road, east, Moon township.....	Jos. W. Hunter, State Hwy. Comr.
New Jersey.....	Elizabeth.....	Aug. 10, 2:30 p.m.	Bldg. macadam road, with coating, Springfield ave.	Jacob L. Bauer, County Engineer.
Florida.....	Pensacola.....	Aug. 10, noon.....	Bldg. 525,000 sq. ft. concrete sidewalks.....	L. Earle Thornton, City Engineer.
Texas.....	Sherman.....	Aug. 10, 11 a.m.	Bldg. 65 miles macadam roadway in Dist. No. 1.....	H. R. Wallace, County Auditor.
Texas.....	Olathe.....	Aug. 10.....	Bdg. Kansas City-Olathe rock road, 18 miles long.....	Bd. Comrs. of Johnson County.
New Jersey.....	Salem.....	Aug. 10, 10:30 a.m.	Grading and gravel surface, 1.78 miles, Elmer Boro. road.....	Harry P. Gray, Dir. Bd. Freehold.
New Jersey.....	Merchantville.....	Aug. 10, 11 a.m.	Bldg. Amesite road in Chapel ave., 14 ft. by .85 mile.....	J. J. Albertson, Co. Engr., Salem
Ohio.....	Cleveland.....	Aug. 10, 11 a.m.	Grade, drain, improve, Broadway road No. 4 to city line.....	F. R. Lander, County Surveyor.
West Virginia.....	Fayetteville.....	Aug. 10.....	Road work; postponed from July 1.....	Henry A. Gentry.
Illinois.....	North Chicago.....	Aug. 10, 8 p.m.	Bldg. cement sidewalks in various streets.....	John Sherwin, Pres. Bd. Loc. Imp.
Ohio.....	Cincinnati.....	Aug. 11, noon.....	Wood block and asphalt paving, curb, etc., Woodward st.; also macadamizing retaining wall, etc., Sycamore street.....	J. J. Wenner, Clk. Dir. Pub. Serv.
Ohio.....	Wooster.....	Aug. 11, 1 p.m.	Brick paving and grading 3,350 lin. ft. of road in Wooster twp.	D. E. McIlvaine, Co. Comr.
Wisconsin.....	La Crosse.....	Aug. 11, 2 p.m.	Brick paving, etc., Division st, 2d to 3d st.; \$1,593.....	Jas. T. Day, Chm. Bd. Pub. Works.
Texas.....	Galveston.....	Aug. 11, noon.....	Paving Scott street road.....	John B. Ashe, County Auditor.
Ohio.....	Akron.....	Aug. 11, 11 a.m.	Grading, draining and improving Kenmore road; \$1,000 check.	Chas. L. Wirth, Clk. Co. Comrs.
Indiana.....	Ft. Wayne.....	Aug. 11, 7:30 p.m.	Paving 7 streets; Frank Randall, City Engineer.....	Frank T. Benoy, Chm. Bd. Pub. Wks.
West Virginia.....	Huntington.....	Aug. 11, noon.....	Brick paving Maple ave., 26th st. and alley; also sewers.....	John Coon, Supt. of Streets.
Kansas.....	Ft. Riley.....	Aug. 11, 10 a.m.	Bldg. 6,600 sq. yds. macadam, 3,900 ft. concrete driveway and curb, 8,000 ft. concrete walks, 950 sq. ft. conc. crossing, 4,500 cu. yds. grading; 500 ft. 12-in. and 200 ft. 10-in. culvert pipe, 6 concrete catch basins, etc.	Capt. W. M. Whitman, Constr. Q. M.
Texas.....	Houston.....	Aug. 11, noon.....	Paving Scott street road.....	John B. Ashe, County Auditor.
Ohio.....	Johnstown.....	Aug. 12.....	Paving 15,000 sq. yds., curbing 8,000 lin. ft.	Village Clerk.
Ohio.....	Cincinnati.....	Aug. 12, noon.....	Shaping up Reading pike ready for oiling, Sycamore twp.	Fred Dreihls, Clk. Co. Comrs.
Ohio.....	Columbus.....	Aug. 12, 2 p.m.	Macadamizing Hilliard-Dublin road improvement.....	John Scott, Clk. Co. Comrs.
Idaho.....	Boise.....	Aug. 12, noon.....	Grading, gravel, boulders, etc., Morris Hill Cem. road.....	W. L. Cuddy, Clk. Co. Comrs.
Nebraska.....	Loup City.....	Aug. 12, noon.....	Constructing cement sidewalks.....	Peter Rowe, City Clerk.
New York.....	Mt. Pleasant.....	Aug. 13, 10 a.m.	Permanent improvement of 1.34 miles Albany Post road.....	Edward F. Hennessey, Town Clerk.
Texas.....	Fairfield.....	Aug. 15, 4 p.m.	Bldg. system of county roads for Dist. No. 1.....	R. L. Williford, County Judge.
California.....	Richmond.....	Aug. 15, 8 p.m.	Oil macadam paving, conc. curb and gutter, 9 blocks, Main st.	I. R. Vaughn, Clk. of Council.
Indiana.....	Danville.....	Aug. 15.....	Brick paving, concrete curb and gutter, cement sidewalks, Logan ave., cost \$20,000 and Douglas st., \$4,000.....	Walter Wynn, City Engineer.
Illinois.....	Ft. McKinley.....	Aug. 15, 10 a.m.	Bldg. service road, grading, etc., at fort.....	Capt. Jas. F. Cohn, Constr. Q. M.
Maine.....	Decatur.....	Aug. 15.....	Brick paving on concrete, 2 streets; cost, \$27,000.....	A. B. Alexander, City Engineer.
Maryland.....	Ft. Howard.....	Aug. 15.....	Bldg. macadam roads, concrete walks, etc., at fort.....	Constructing Quartermaster.
New Jersey.....	Montvale.....	Aug. 15.....	Grading and macadamizing 2.205 miles road.....	F. C. Lindeman, Mayor.
Illinois.....	Pekin.....	Aug. 15.....	Paving Second, Sixth and Elizabeth streets.....	R. P. Van Duesen, City Engineer.
Pennsylvania.....	South Bethlehem.....	Aug. 15, 8 p.m.	Amiesite paving on Telford base, Spruce st., 4th to 5th.....	James L. Elliot, Chm. St. Com.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREET IMPROVEMENTS (Continued)				
Minnesota	Two Harbors	Aug. 15, 10 a.m.	Clearing and grubbing portion of country road	John P. Paulson, County Auditor.
North Dakota	Cando	Aug. 15, 1 p.m.	Bldg. grade 80 rods long, six 2.5x30 ft., cor. steel culverts	Frank Shanley, County Auditor.
Ohio	Upper Sandusky	Aug. 16, noon	Grading and stoning a road	Peter Frank, Jr., County Auditor.
New York	Albany	Aug. 16	Paving and curbing Vine street	W. Greenalch, Comr. Pub. Wks.
Nebraska	Omaha	Aug. 16, 8 p.m.	Paving, any material, curbing, etc., 12 streets	Dan B. Butler, City Clerk.
Indiana	Anderson	Aug. 16	Grading and macadamizing roads in 5 townships, 4.5 miles long, 16,611 ft., 13,255 ft., 7,963 ft. and 10,676 ft. long	Wm. T. Richards, County Auditor.
Ohio	Toledo	Aug. 17, 10 a.m.	Grading, draining, macadamizing Point Place road	Chas. J. Sanzenbacher, Co. Auditor.
Indiana	South Bend	Aug. 17	Bldg. new and repairing defective walks and curbs	O. C. Bastian, Pres. Bd. Pub. Wks.
Pennsylvania	Harrisburg	Aug. 17, 2 p.m.	Bldg. 15,000 ft. road: Carroll, 1,369 ft., Union twp., Wash. Co.	Jos. W. Hunter, State Hwy. Comr.
Alabama	Birmingham	Aug. 17, 11 a.m.	Paving 120,000 sq. yds., any suitable material	Maury Nicholson, City Engineer.
Indiana	Ft. Wayne	Aug. 18, 7:30 p.m.	Five-ft. cement walks, grading, etc., Calhoun and Harrison sts.	H. W. Becker, Chm. Bd. Pub. Wks.
Pennsylvania	Monessen	Aug. 18	Vit. repressed block paving, 2,700 sq. yds., curb 2,200 ft.	J. A. Sheetz, Chm. St. Com.
Missouri	Toledo	Aug. 19	Repairing Lewis ave. macadam road, Washington township	C. J. Sanzenbacher, County Auditor
Iowa	Spencer	Aug. 19, 8 p.m.	Bldg. cement sidewalks	R. L. Taylor, City Clerk.
Virginia	Roanoke	Aug. 19, noon	Bldg. granolithic sidewalks; F. L. Gibboney, City Engineer	W. L. Craft, City Clerk.
Wisconsin	Racine	Aug. 20, 10 a.m.	Grading various streets; 2 contracts	P. H. Connolly, Chm. Bd. Pub. Wks.
Utah	Ft. Douglas	Aug. 20, 10 a.m.	Bldg. roadways, concrete walks, drains, grading, etc.	K. P. Williams, Constr. Q. M.
Ohio	Toledo	Aug. 22, 10 a.m.	Grade, drain, macadamize road in Waterville twp.	C. J. Sanzenbacher, County Auditor.
Kentucky	Paducah	Aug. 23, 3:30 p.m.	Granite curb, 24,720 lin. ft.; concrete gutter, 25,200 lin. ft.; concrete walks, 78,200 sq. ft.; concrete driveways, 5,430 sq. ft.; c.-i. drain pipe, 1,000 lin. ft.; sewer, 10-24-in., 1,215 ft., culverts A, B, C and D, also 225 cu. yds. conc. retain. wall.	L. A. Washington, City Engineer.
Florida	Perry	Aug. 25	Paving from 3 to 5 miles of streets, price per sq. yd.	W. E. Battle, Mayor.
New Jersey	Pt. Mott	Aug. 25, 11 a.m.	Bldg. oyster shell road from Harrisonville to fort	Constr. Q. M., Ft. Dupont, Del.
California	Hermosa Beach	Sept. 23	Warrenton paving, on 5-in. bituminous concrete base, \$60,000.	E. McCoskey, City Clerk.
Ohio	Cincinnati	Aug. 26, noon	Improving Harrison and New Haven road; \$3,000 bond	Stanley Struble, Pres. Co. Comrs.
SEWERAGE				
Kentucky	Louisville	Aug. 5, noon	Bldg. Sec. A, Western Interceptor, Contract 72: 3,239 ft. 5-ft. rein. concrete sewer, av. cut, 19.1 ft., inc. 1,450 cu. yds. concrete, 67,000 lbs. steel, 3,239 ft. earth excav	P. L. Atherton, Chm. Sewer Bd.
Illinois	Chicago	Aug. 5, 11 a.m.	Bldg. a brick sewer in 73d st.	B. J. Mullaney, Comr. Pub. Works.
Nebraska	Seward	Aug. 5, 8 p.m.	Bldg. \$400 sanitary sewer in Dist. No. 7	Mell Gordon, City Clerk.
Indiana	Laporte	Aug. 8, 7:30 p.m.	Bldg. 2 sewers; costs, \$392.50 and \$172.50	Geo. H. Rempler, City Clerk.
New Jersey	Madison	Aug. 8, 8 p.m.	Bldg. 12 miles 8 to 18-in. sewer flush tank, ejector station, etc.	Hering & Fuller, 170 Bwy. N. Y. City
Ohio	Cleveland Hgts.	Aug. 9, noon	Bldg. sewers, water mains, etc.; F. A. Pease Eng. Co., Cleveland	H. H. Canfield, Village Clerk.
California	Pasadena	Aug. 9, 11 a.m.	Bldg. rein. concrete storm water sewer; cost, \$155,000	Heman Dyer, City Clerk.
Illinois	Libertyville	Aug. 9, 6 p.m.	Bldg. connected system of sewers	H. B. Eger, Pres. Bd. Loc. Imp.
Illinois	Chicago	Aug. 10, noon	Bldg. rein. concrete ditch outfalls on north shore channel, and collateral work	R. R. McCormick, Pres. San. Dist.
Indiana	Ft. Wayne	Aug. 11, 7:30 p.m.	Bldg. main sewer in alley from Darrow street	H. W. Becker, Clk. Bd. Pub. Wks.
West Virginia	Huntington	Aug. 11, noon	Bldg. sewers in 2 streets and 3 avenues; brick paving	A. B. Maupin, City Engineer.
Florida	St. Petersburg	Aug. 11, 7 p.m.	Furn. and lay or lay only 1,800 ft. 16-in. c.-i. flange outlet sewer pipe in Tampa Bay; M. W. Spencer, City Engineer	W. F. Divine, City Clerk.
New York	Brooklyn	Aug. 12, 11 a.m.	Bldg. and repairing sewers in various streets	A. E. Steers, Borough President.
Kansas	Hutchinson	Aug. 12, 3 p.m.	Bldg. sewers: 4,300 ft. 18-in. vit. or concrete tile, 3,500 ft. rectangular concrete drain, 2,000 ft. open ditch, inc. 1,500 cu. yds. excav.; G. L. McLane, City Engineer	Ed. Metz, City Clerk.
Ohio	Akron	Aug. 12	Bldg. storm sewer in W. Main st. before paving	Service Director Klein.
New York	Rochester	Aug. 13, 10 a.m.	Bldg. sewage disp. plant, etc., new Tuberculosis Hospital	Thos. J. Bridges, Chm. Co. Bldg. Com.
Iowa	Battle Creek	Aug. 15	Bldg. \$7,000 sewer system, of 6, 8 and 12-in. vit. pipe	E. E. Carlson, Engineer.
Illinois	Danville	Aug. 15	Bldg. \$28,000 vit. pipe storm water sewer system in Germantown	Walter Wynn, City Engineer.
Wisconsin	West Allis	Aug. 15	Bldg. 24,000 feet of sewers	L. F. Fish, City Clerk.
South Dakota	Groton	Aug. 15, 8 p.m.	Bldg. sewer extension	A. P. Fuller, City Auditor.
Illinois	Pekin	Aug. 15	Bldg. storm water and sanitary sewers; cost, \$141,000	W. J. Conzelman, Mayor.
Indiana	Marion	Aug. 19	Constructing North Marion sewer; also others later	Pres. Willson, Bd. of Pub. Works.
Iowa	Ft. Madison	Aug. 20	Bldg. 10,000 ft. sanitary sewer; cost, \$8,000	M. E. Bannon, City Engineer.
Texas	Ft. Crockett	Aug. 22, 2 p.m.	Bldg. sanitary sewer system and pumping plant	Capt. P. Whitworth, Q. M.
Ohio	Cleveland Hgts.	Aug. 23	Constructing pipe sewers	H. H. Canfield, Village Clerk.
Saskatchewan	Estevan	Aug. 24, 8 p.m.	Furnishing sewer pipe, also laying storm sewers	Chipman & Powers, Engrs., W'n'p'g.
Pennsylvania	West View	Oct. 1	Bldg. main sewer and disposal plant, plans by Trimble & Miller, Fourth ave., Pittsburg	H. L. Donaldson, Boro. Sec'y.
WATER SUPPLY				
Illinois	Whitehall	Aug. 5, 6 p.m.	Pumping the water supply	Francis Fowler, Mayor.
Nebraska	Omaha	Aug. 5, 7 p.m.	Bldg. w. w. system, brick pump. sta.; 12x80 ft. steel standpipe on concrete base; 25 h.p. gaso. engine, pipe con. and belt, 3 miles 8, 6 and 4-in. c.-i. mains, hydrants, etc.	J. C. Gay, City Clerk.
California	Ft. Barry	Aug. 6, 11 a.m.	Bldg. reservoir, wooden tank and extending mains	Maj. G. McK. Williamson, Q. M.
Ontario	London	Aug. 8	Electrical pumping equipment for Springbank Pumping station	Sec'y Ellwood, Bd. Water Comrs.
South Dakota	Philip	Aug. 8, 3 p.m.	Bldg. water works system	A. S. Anderson, City Auditor.
Ohio	Waverly	Aug. 8, noon	Furn. mat. and erecting complete water-tight rein. concrete stand pipe, 80 ft. high, 18 ft. outside diam., with inlet, mud and overflow pipes, ladders, etc.; alt. bids on all steel structure on bidders' plans	E. P. P. Smith, Village Clerk.
Minnesota	Lanesboro	Aug. 8, 1 p.m.	Constructing arched cistern	Nels Storie, Chm. School Board.
Montana	Miles City	Aug. 8, 3 p.m.	Constructing water system and 2 hydrants	A. N. Yoder, Sec'y St. Reform Sch.
Pennsylvania	Harrisburg	Aug. 8, 3 p.m.	Changing settling basin	J. A. Affleck, Pres. W. & L. Com.
California	Holtsville	Aug. 9	Furn. 40-h.p. gaso. engine, duplex double-action plunger pump, 50,000-gal. steel tank, 75 ft. steel tower, pipe, hydrants and joints for new municipal water system	Bd. Trustees C. of City Clerk.
Ohio	Cleveland Hgts.	Aug. 9, noon	Laying 10-in. main in Cedar road; F. A. Pease Eng. Co., Cleveland	H. H. Canfield, Village Clerk.
Pennsylvania	Emporium	Aug. 9	Bldg. reservoir and laying 3 miles 12-in. c.-i. pipe	Emporium Water Co.
Missouri	Slater	Aug. 9	Bldg. concrete reservoir and chimney; furn. f.o.b. city 2 high-speed engines, feed pumps, generators, etc.	J. A. Stern, City Clerk.
New York	Cherry Creek	Aug. 10, 8 p.m.	Furn. mat. and bldg. w. w.: 6 miles 8, 6 and 4-in. c.-i. pipe, 42 fire hydrants, gate valves, conc. reservoir, etc.	Emory Kent, Pres. Village Trus.
South Dakota	Edgemont	Aug. 10, 10 a.m.	Boring artesian well and piping with 2,900 ft. 4 and 5-in. pipe	C. A. Hardy, City Auditor.
Nebraska	Alliance	Aug. 10, noon	Constructing extension of water works; \$22,851	F. W. Irish, City Clerk.
Indiana	Hammond	Aug. 10	Laying 3-4-in. lead pipe	O. H. Duellke, Pres. Bd. Pub. Works.
Florida	Key West	Aug. 15, noon	Furn. 2 stand. Scotch stat. boilers and one condenser	Wm. R. Porter, Chm. Bd. Pub. Wks.
Oklahoma	Bridgeport	Aug. 15	Extending w. w. system, bldg. new power house, one 25 h.p. 2-cylinder gaso. engine, 7x8 triplex single-acting pump	City Clerk.
Montana	Miles City	Aug. 22	Furn. mat. and extend. w. w. light and sewer systems	J. E. Farnum, City Clerk.
Ohio	Euclid	Aug. 22, noon	Bldg. 6-in. water main in Lawnview ave.	Nelson J. Brewer, Village Clerk.
Washington	Ft. George Wright	Aug. 22, 11 a.m.	Sinking 10-in. tubular well	Lieut. A. L. Sneed, Q. M.
Ohio	Cleveland Hgts.	Aug. 23, noon	Laying mains in 5 streets	H. H. Canfield, Village Clerk.
New York	Keeseville	Aug. 25, 7 p.m.	Furn. 450 pieces 10-in. B. & S. c.-i. pipe, class C, 850 lbs. per length; 11,000 lbs. pig lead, 1 ton specials, 1 stand. m. h. frame and cover, 22-24-in.; two 10-in. and one 4-in. gate valves and boxes; one 10x24-in. copper strainer; laying 5,300 ft. 10-in. pipe, etc.; rock excav., granite in reservoir, 1,604 cu. yds.; concrete in reservoir, 345 cu. yds., in manhole, 5.28 cu. yds.; 3,200 brick in manhole; 250 lbs. sundry iron work; W. G. Stone, Mann Bldg., Utica, Engr.	J. B. Mace, Pres. Water Bd.
North Carolina	Roxboro	Sept. 1	Water works improvements, \$2,500, inc. 1000 ft. pipe extension	N. Lunsford, Mayor.
North Dakota	Grand Forks	Sept. 5	Reconstructing stone sand filter, constructing rapid sand filter	C. J. Evanson, City Auditor.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
BRIDGES				
Indiana	Indianapolis	Aug. 6, 10 a.m.	Bldg. 7 culverts; repairing Cumberland gravel road.	Carl Von Hake, Chm. Co. Comrs.
Oklahoma	Okemah	Aug. 8	Bldg. 25 steel and wooden bridges.	E. Stine, City Clerk.
Utah	Salt Lake City	Aug. 8, 10 a.m.	Bldg. concrete culvert, 19th st. east over Emig Can. creek.	M. Z. Witcher, County Clerk.
Indiana	Rockville	Aug. 8, 11 a.m.	Bldg. three 80-ft. span rein. concrete bridge, 308 ft. long, or wood bridge, 2 spans, 123 and 133 ft., and 280 ft. over all, over Big Raccoon at Roseville.	H. A. Henderson, County Auditor.
Pennsylvania	Pittston	Aug. 8, 2 p.m.	Repairing 3 timber bridges.	J. M. Norris, County Comptroller.
Minnesota	Melrose	Aug. 8, 1 p.m.	Rebuilding steel bridge, Sauk river.	J. P. Rau, County Auditor.
Ohio	Columbus	Aug. 8, noon	Encasing concrete abutments, McKinley bridge.	F. M. Sayre, County Auditor.
Michigan	Michigan City	Aug. 9, 10 a.m.	Constructing bridge and abutments and 3 culverts.	C. F. Miller, County Auditor.
Illinois	Walshville	Aug. 9, 10 a.m.	Constructing reinforced concrete bridge.	T. M. Barlow, Town Clerk.
Ontario	Toronto	Aug. 9, noon	Bldg. beam and slab rein. concrete viaduct, Westm. road; excav. 1,068 cu. yds.; concrete retaining walls, 472 cu. yds.; viaduct, 577 cu. yds.; rein. steel, 126,000 lbs.; pipe railing.	Mayor G. R. Geary, Chm. Bd. Cont'l.
Pennsylvania	Holidaysburg	Aug. 9	Bldg. several concrete arch bridges throughout county.	Board of County Commissioners.
California	Napa	Aug. 9	Bldg. 2 stone bridges on Browns Valley road.	Board of County Supervisors.
Ohio	Sandusky	Aug. 10, 10 a.m.	Bldg. hwy. bascule bridge and approaches; Huron village.	John Deist, County Auditor.
Ohio	Cleveland	Aug. 10, 11 a.m.	Bldg. bridge work, Report 2679 at Gate Mills, Mayfield twp.	F. R. Lander, County Surveyor.
Iowa	Des Moines	Aug. 10, 10 a.m.	Bldg., complete, 6-span rein. concrete and highway bridge, each span 68 ft. clear, roadway 58.5 ft., and two 12-ft. sidewalks; \$10,000 bond.	James R. Hanna, Mayor.
Indiana	Mishawaka	Aug. 11	Bldg. concrete beam bridge.	Wm. Moore, City Engineer.
Pennsylvania	Lock Haven	Aug. 12, 1 p.m.	Bldg. steel span bridge, Kreodone, block floor and concrete sub-structure and floor over creek at Keating.	Bd. Comrs. of Clinton County.
New York	Conklin	Aug. 12, 10 a.m.	Repair abuts. and pier of bridge over Susquehanna river.	Frank Stanford, C. of Town Clerk.
Ohio	Saltillo	Aug. 12, 10 a.m.	Constructing superstructure.	G. T. Drake, Bridge Comr.
Indiana	Liberty	Aug. 13, 1 p.m.	Constructing arch concrete bridge.	Clinton Gardner, County Auditor.
Ohio	Newark	Aug. 13, 1 p.m.	Bldg. sub. and superstructures of various bridges.	Fred S. Cully, County Surveyor.
Indiana	Anderson	Aug. 16	Bldg. 5 rein. concrete and steel bridges near city.	A. Smith, County Engineer.
Indiana	Jefferson	Aug. 16, 1 p.m.	Constructing reinforced concrete beam bridge.	A. V. Hillyer, Clerk, Comrs.
Maryland	Baltimore	Aug. 17, 11 a.m.	Bldg. steel and concrete bridge over Jones' Falls at Pratt st.; \$1,000 check; O. F. Lackey, Harbor Engineer.	J. Barry Mahool, Chm. Bd. Awards.
Ohio	Cincinnati	Aug. 19, noon	Constructing concrete bridge.	Stanley Struble, Pres. Co. Comrs.
Iowa	Ft. Dodge	Aug. 22, 7:30 p.m.	Bldg. metal viaduct, 823 ft. long, sub. and super. complete; also remove old and erect new 330 ft. steel superstructure.	S. J. Bennett, Mayor.
New York	Oswego	Aug. 23, noon	Bldg. bridge over Oswego Canal; cost, \$39,735.	F. M. Williams, State Engr., Albany.
Montreal	Quebec	Sept. 1, noon	Bldg. Quebec bridge superstructure; \$500,000 check.	L. K. Jones, Sec'y Dept. Rys. & Can.
South Carolina	Gaffney	Sept. 5	Rebldg. steel approaches on concrete base, repair bridge, etc.	E. Felix Lipscomb, County Suprv.
LIGHTING AND POWER				
New Jersey	Newark	Aug. 5, 2:30 p.m.	Bldg. elec. light and power plant at County Court House.	L. E. Voorhees Bd. Freeholders.
Illinois	Evergreen Park	Aug. 6, 8 p.m.	Installing poles, wires, globes, etc., for 22 lamps in village.	Board of Village Trustees.
Indiana	Brazil	Aug. 8	Electrical plant, heating, plumbing, County Infirmary.	Board of County Commissioners.
Pennsylvania	New Cumberland	Aug. 8	Lighting city and Elkwood with arc lights.	Borough Council.
Missouri	Slater	Aug. 9	Furn. mat. and extending w. w. and light plant, inc. generators, switchboard and transformers, 2 high-speed engines, for 60 and 100-kw generators, boiler and feed pump for city.	Burns & McDonnell, K. C., Mo.
California	Oakland	Aug. 10, 11 a.m.	Furn. elec. equipment for new fire alarm and police teleg. bldg.	W. B. Fawcett, Sec'y Bd. Pub. Wks.
Montana	Miles City	Aug. 22	Furn. material and extending light, water and sewer systems.	J. E. Farnum, City Clerk.
Saskatchewan	Estevan	Aug. 24, 8 p.m.	Power house, 2 return tubular boilers, high-speed steam engine, electric lighting system; also sewers.	J. G. Hastings, Mayor.
Manitoba	Winnipeg	Sept. 1, noon	Furn. and installing 46,000 ft., 13,000-volt, 3-core cable.	M. Peterson, Sec'y Bd. Control.
MISCELLANEOUS				
Ontario	Leamington	Aug. 5, 6 p.m.	Dredging in Eastern and Western Divisions, Pt. Pelie system.	Alfred Hairsine, Twp. Clerk.
Wisconsin	Racine	Aug. 6, 10 a.m.	Bldg. 200-ft. concrete pier, per lin. ft.; also concrete lake shore protection for 3 blocks, price per lin. ft. built.	P. H. Connolly, Pres. Bd. Pub. Wks.
California	Oakland	Aug. 10, 11 a.m.	Bldg. concrete quay wall, between Myrtle and Clay streets.	W. B. Fawcett, Sec'y Bd. Pub. Wks.
North Dakota	Rugby	Aug. 10	Bldg. Court House and jail; Breshner & Orth, Architects.	Henry Albertson, County Auditor.
Tennessee	Dyersburg	Aug. 10, noon	Bldg. 2-story and base brick court house; B. B. Davis, Arch.	Geo. T. Weakley, Chm. County Court.
New York	Rochester	Aug. 13, noon	Furnishing 69,500 bulbs for Board Park Commissioners.	M. O. Stone, Sec'y Park Board.
Kentucky	Dayton	Aug. 15, 8 p.m.	Franchise, 20-year, to construct conduits, erect poles, string wires, for telephone service; to highest and best bidder.	Will C. Martin, City Clerk.
New Jersey	Westfield	Aug. 18	Erecting fire house; cost, \$20,000 complete; old bids too high.	Town Council.
Florida	Jacksonville	Aug. 24	Dredging and removal of rock in Biscayne Bay.	Geo. R. Spalding, Capt. U. S. Engrs.
Massachusetts	Boston	Sept. 2, noon	Bldg. stone wharf, Pier No. 6, South Boston, 1,200 ft. long, 300 ft. wide, inc. 414,600 cu. yds. dredging, 274,600 cu. yds. fill; furn. 94,000 cu. yds. gravel, 40,200 cu. yds. rip-rap and stone ballast, 1,295 spruce piles, 730 cu. yds. concrete, 45,750 cu. yds. stone masonry below and 14,100 above low water, 95 lin. ft. bulkhead, 2,700 lin. ft. fenders on face of wall.	State Bd. Harbor Comrs.

STREET IMPROVEMENTS

Albertville, Ala.—Marshall County is to vote on \$1,000,000 good road bond issue.

Birmingham, Ala.—Number of streets in Sixteenth Ward and in other sections of the city are to be improved.

Gadsden, Ala.—Brick paving may be extended in Forest ave. from 6th to 8th sts., two blocks, also in other streets.

Greenville, Ala.—Butler County has voted bonds for construction of sand-clay roads; first issue \$155,000; engineer not employed.—H. D. Lampley, Judge of Probate.

Mobile, Ala.—Board of Public Works has decided to pave Springhill ave.; cost \$52,914.

De Queen, Ark.—City has ordered construction of about four miles of concrete sidewalks.

Texarkana, Ark.—Petition to pave Pine and cross streets has been granted.

Dundee, Cal.—Asphalt will be used in the new paving district.

Pasadena, Cal.—North Raymond st. will be paved, probably with rock macadam; Lincoln ave. and Old Fair Oaks will be graded, curbs and gutter laid.

Stanford University, Cal.—Boulevard will be built from University to Los Altos, eight miles.

Denver, Col.—The State Highway Commission has appropriated \$12,250 to six counties for improving roads, as follows: San Juan County, \$3,000; Ouray, \$1,000; Montezuma, \$1,250; La Plata, \$3,000; Garfield, \$1,500, and Mesa, \$2,500; of these San

Juan will spend \$20,000 on road from Durango through Silverton to Ouray, and La Plata \$9,000 on three roads; apportionments will be made to other counties as soon as they appropriate funds themselves. Address Thomas H. Tully, Member State Highway Commission.

Denver, Col.—Three million dollars are to be expended on street improvements; eight firms have \$1,200,000 worth of work on hand and more contracts will be awarded as soon as some of this work is completed.—City Engineer Hunter.

St. Augustine, Fla.—City may purchase an asphalt plant large enough to use in new construction. More paving is contemplated than at any time in the city's history.

St. Augustine, Fla.—Saville st. will be paved with brick and Sanagasser st. with asphalt.

Elberton, Ga.—Citizens will vote Aug. 17 on \$25,000 bonds for roads.

Belleville, Ill.—Ordinance for laying granite sidewalks on both sides of High st. has been passed.

Freeport, Ill.—Contract will be let about middle of August for paving Maple ave. with tar macadam as an experiment; work on Exchange and Liberty sts., as well as one block on Float st. will also be done this year. Superintendent of Streets Place.

Harvard, Ill.—City is considering construction of paving.—J. H. Vickers, Mayor.

Silvis, Ill.—Village Board of Trustees has instructed Attorney G. A. Shalberg to

draft an ordinance providing for the laying of curbing on all streets and avenues and for the establishment of surface gutters, so the village will be in position at any future time to take up paving improvement ordinances. Plans for the Silvis storm drain are now being drawn by Wallace Treichler, Engineer.

Taylorville, Ill.—City will receive bids about Sept. 1 for 20 or more blocks of brick paving.

Bloomfield, Ind.—Commissioners of Greene County will soon ask for bids for construction of 15,340 ft. of gravel road in Jefferson Township.—Peter M. Cook, County Auditor.

Evansville, Ind.—Paving of portions of Powell ave. with asphalt, cost \$17,413, is being considered.

Evansville, Ind.—A number of sidewalk improvement orders have passed.

Mishawaka, Ind.—City Engineer has been directed to prepare plans for improving and paving West 2d st.

Muncie, Ind.—County Commissioners will improve Wysox st.

New Albany, Ind.—Board of Public Works of city has ordered partial reconstruction of Main street, from Pearl street to Bank street, with a compound resembling asphalt, mixed with concrete, gives a good wearing surface.

Plymouth, Ind.—Petition is circulating on South st. for brick pavement.

Vincennes, Ind.—Improvement of one mile of 14th st., from Hart to Willow st., 50 ft. wide, with gravel 30 ft. wide and

6 in. deep; also 600 ft. of 24-inch sewer; will cost \$11,000.—Address Robert Lind, Engineer, or County Auditor Scott.

Clinton, Ia.—Paving Main st. with creosoted block has been ordered; 8,330 sq. yds. blocks, 2,040 lin. ft. concrete curbing, 13 catch basins.

Hutchinson, Kan.—City Clerk has been authorized to advertise for bids for 7th st. and Poplar st. drains.

Hutchinson, Kan.—Commissioner of Public Utilities Charles Oswald has been authorized to purchase a steam roller and grader.

Plevna, Kan.—This new third-class city is planning extensive improvements in streets and sidewalks.

Holyoke, Mass.—Board of Works has voted to lay new walks and curbs in several streets.

Holyoke, Mass.—Macadam road will be constructed from city line to Kenilworth Castle.

Lowell, Mass.—Committee on Streets has recommended widening of Lawrence st., rebuilding bridge there, at a point nearly opposite the Wamesit Power Co.; City Engineer G. T. Bowers' estimates for the work follow: To widen the bridge, \$1,000; to move back stone wall 10 ft., \$832; to reset sidewalk, \$160; refilling, \$750; mortar wall for sheds, \$217; concrete, \$400; fence, \$175; total, \$7,200; car tracks will also have to be moved to the middle of the street, which will have to be repaved; cost \$3,840; 658 ft. of water pipe relaid, \$1,360; total, \$12,400, which with the first item will make a total of \$20,400.

Lowell, Mass.—The Board of Trade is working for a State highway along the banks of the Merrimac River.

Minneapolis, Minn.—Park Board will construct boulevard from 16th ave. to Camden Park.

Carthage, Mo.—Plans for oiling streets are being discussed. C. B. Platt is interested.

St. Joseph, Mo.—Oiling of several streets has been ordered.

St. Joseph, Mo.—City proposes to pave portion of 24th st. with brick; cost \$11,230.

Bayonne, N. J.—Property owners on 38th st. are urging action on their petition for pavement and sidewalks.

Perth Amboy, N. J.—Petition for paving Penn st. received.

Perth Amboy, N. J.—Asphalt dressing will be laid on walk from Lehigh Valley Railroad to a mile beyond City Hospital.

Trenton, N. J.—Whittier ave. is to be paved with fibertine on a concrete base from Whittier to Parkside ave.; Jackson st. is to be widened from Front st. to the Assanpunk Creek.—Abram Swan, City Engineer.

Trenton, N. J.—Sum of \$15,000 bonds for paving and \$10,000 for sidewalks have been sold.

Massena, N. Y.—Proposition to raise \$3,000 by bonds for highway improvements has been defeated.

Niagara Falls, N. Y.—The paving of Pine st. has been recommended by Council; cost \$40,497.50.

Seneca Falls, N. Y.—Residents of Cayuga st. are considering plans for paving that thoroughfare in conjunction with State road improvement.

Scarsdale, N. Y.—Citizens have voted \$50,000 bonds for road improvements.

Schenectady, N. Y.—Committee on Roads and Bridges has been ordered to make inquiries as to advisability of purchasing an asphalt plant for repair and new work.

Schenectady, N. Y.—Petition received for paving Wall st. with asphalt; ordinance passed for paving Lakeview ave.

Greensboro, N. C.—City will pave Buchanan and Davis sts. with asphalt, bitulithic or vit. brick; about 12,000 sq. yds.; bids will be advertised.—J. R. Cutchin, Chairman Street Commission.

Roxboro, N. C.—Citizens have voted \$22,500 bonds for street improvements; macadamized streets and granolithic sidewalks contemplated; date of opening bids not settled.—Nathan Lunsford, Mayor.

Bellaire, O.—Belmont is to be improved to a width of 50 ft.

Cincinnati, O.—Park Board will have roads in Eden Park treated with heavy residuum oil with 25 per cent of asphalt, on advice of Park Expert George E. Kessler. Address President Ault.

Fostoria, O.—Council has adopted resolutions to improve North st., County Line st., Center and North sts., from Vine st. to Adams st.

Hamilton, O.—Declaratory resolution for paving and sewerage South C st. has been passed.

Maumee, O.—Bids will be received Aug. 10 for \$28,000 paving bonds.

Altoona, Pa.—All the four bond propositions were carried at the election, viz., \$100,000 paving, \$25,000 bridge, \$60,000 sewers, \$75,000 street repairs.

Beaver Falls, Pa.—Council is considering improvement of sidewalks throughout town.

Butler, Pa.—Lookout ave. and Monroe st. will be paved with vit. brick.—Geo. W. Avery, Burgess.

Harrisburg, Pa.—Chairman Miller of the Special Councilmanic Committee on Paving Specifications returned the report of his committee endorsing the specifications of City Engineer Cowden; these specifications are for 281,500 sq. yds. of paving and 240,000 ft. of curbing.

Philadelphia, Pa.—Council has voted \$30,000 for repairs to asphalt streets, \$199,000 for repairing five streets and \$25,000 for surfacing macadam streets.

Scranton, Pa.—Plans are being worked out for widening streets about court house.

Scranton, Pa.—Bids will soon be asked for new road over the Pocono Mountain; cost \$20,000.—A. B. Dunning, Engineer.

West Hazleton, Pa.—Borough Council has decided to use oil on streets to allay dust. Address Mr. Reese, Chairman Special Council Committee.

Lead, S. D.—City will lay about a mile of cement sidewalks. Address Alderman Cooper.

Columbia, Tenn.—Garden st. at its intersection with Depot st. will be widened and the dangerous turn at the corner eliminated.

Knoxville, Tenn.—Chairman J. W. Fleniken, Board of Public Works, has been instructed to purchase the brick for paving the Asylum ave. viaduct at the lowest and best figure, the quality of the brick being taken into consideration and the test to be made according to the standard brick test.

Dallas, Tex.—City Engineer J. M. Preston has prepared specifications for paving Pearl, Camp and Griffin sts.

Harlingen, Tex.—Citizens have voted \$30,000 bonds for street improvements and water works.

Oakville, Tex.—Live Oak County Commissioners, Precinct No. 1, have voted \$25,000 bonds for road improvements.

Cheney, Wash.—Seventh ave. improvement district has been formed for grading, curbing and laying sidewalks.

Snohomish, Wash.—Cement curb and sidewalks will be laid to the Northern Pacific depot.

Tacoma, Wash.—Municipal Commission has adopted resolutions for improving Union ave. and other streets in District 276, South 53d, 54th, 55th and 47th sts.—Owen Woods, Commissioner of Public Works.

Morgantown, W. Va.—County Court has asked for bids on paving of Holland ave. on West Side.

New Westminster, B. C., Can.—Ratepayers have passed by-law to issue \$150,000 street improvement debentures.

CONTRACTS AWARDED

Birmingham, Ala.—McCartin Construction Co. for paving under improvement ordinance No. 530, new series, \$3,552; also under ordinance 518, \$1,201; Paul Richter for sidewalk paving, ordinance 518, \$445, and R. S. Blome & Co., ordinance 518, \$10,620.

Prescott, Ariz.—Constructing roads, walks, bridges, gutters, etc., at Whipple Barracks, Henry Rockmark, city, roads, catch basins, drains and bridge, \$8,915; John Shea, city, concrete walks, oiled walks, curbing and gutters, culverts, steps and horse blocks, \$8,915.

Los Angeles, Cal.—Improving Compton Watts portion of Long Beach Blvd., to F. F. Prendergast, 3867 Denker ave., \$12,372.

Napa, Cal.—Moyer Bros., macadamizing part of Brown's Valley road, \$6,000.

Pasadena, Cal.—The John R. Ott Construction Co., curbing, guttering and oil macadam paving on Villa st., \$24,652; Lake ave., \$14,479; Andrew Holloway, oil macadam, Center st., \$12,281; W. A. Dontanville, Norwood drive; also for laying a cement sidewalk on Grand, from Bradford to Bellefontaine, and grading same, \$15,144; B. A. Shlar, sidewalk on California st., from Lake to Wilson, at \$378.80; also Michigan ave., from Colorado st. to the railway tracks, \$1,272.

Middletown, Conn.—Roger Kennedy, resurfacing Middlesex turnpike.

Washington, D. C.—Paving various streets and avenues to Cranford Paving Co., of Washington, D. C., \$1.77 per sq. yd. for asphalt, and to Washington Asphalt Block & Tile Co., city, asphalt block, \$1.65 per sq. yd.

St. Augustine, Fla.—Five-ton steam roller, to Good Roads Machinery Co., \$1,800; Kelley Springfield Co., \$1,975.

Carmi, Ill.—A. W. Eisenmayer, Granite City, work in new paving district, \$60,000.

Centralla, Ill.—Bedford Stone Co., for sidewalk stone for year, 3-in. 10c., 4-in. 13.5c. per sq. ft. f. o. b. Centralla.

Peoria, Ill.—Brewster & Evans, Ellis st., \$6,847.60.

Bloomington, Ind.—Brick paving as follows: Portions of College and Kirkwood aves. to C. M. Kirkpatrick, Greenfield, \$32,984; portions of Walnut and 6th Sts., G. T. Miller, Lebanon, \$29,211.

Evansville, Ind.—Bedford & Nugent, paving Governor st. with mach. block, \$1.73, or \$1.84 with cement filler and asphalt joints; competing bids for asphalt were Stinchfield, Reichert & Saunders, representing Obispo asphalt, \$1.79; the Western Asphalt Co. \$1.79 on Buena Vista asphalt and \$1.97 on Trinidad.

Laporte, Ind.—Macadamized road for county, to W. B. Hutchinson, \$3,650.

Des Moines, Ia.—Paving, as follows: 5,155 sq. yds. asphalt on 30th st., to Bryant-Ford-McLaughlin Co., of Waterloo, \$2.15 per sq. yd., and 2,750 sq. yds. brick on E. Walker st., to J. W. Turner Improvement Co., \$2 per sq. yd.

Kansas City, Kan.—Paving with asphalt to Cleveland Trinidad Co., although the Parker Washington Co. was lowest bidder; Colorado avenue, Broadway, Twenty-eighth st., Thirty-third st. (two sections).

Louisville, Ky.—Building thirteen pieces of asphalt street construction to American Standard Asphalt Co., at prices ranging from \$1.80 to \$1.90 per sq. yd.; estimated cost, \$50,000.

Portland, Me.—Constructing 1500 lin. ft. of bituminous macadam road to Northeastern Paving Co., city, \$8,257.

South Portland, Me.—3,000 ft. macadam road, to John W. Gulliver, 120 Exchange st., Portland, \$4,449.

Havre de Grace, Md.—E. M. Good, macadamizing road to Aberdeen, \$8,000 per mile.

Boston, Mass.—Street and sidewalk work in various sections, which aggregate \$125,000; to James T. Timilty \$25,667 for brick paving on Geneva ave., Dorchester; to Jas. Doherty to the amount of \$23,727; to C. W. Doherty & Co., \$23,865, and to Joseph B. Rourke & Co.

Greenville, Mich.—Paving Lafayette st., to C. E. Williams, Grand Rapids, \$24,000.

Lansing, Mich.—Capitol ave., 6,354 sq. yds. asphaltic concrete, to Kneal & Ryan, city, and Turner st., \$4,152 sq. yds. brick, to J. H. Algate, city.

St. Louis, Mo.—Improvement of 6½ miles of streets, at a cost of \$373,000; Rosalie st., Carter ave., Fair ave., asphalt, to Trinidad Asphalt Mfg. Co., \$4,260; Cote Brillante ave., Kingshighway Blvd., Union Blvd., asphalt, to same, \$14,751; McLaran ave., Broadway, Church rd., brick, to John B. Turner, \$6,566; Keokuk st., Missouri ave., Broadway, brick, to Ruecking Construction Co., \$5,058; Ohio ave., Miami st., Cherokee st., brick, to Wm. R. Bush Construction Co., \$11,831; Hereford st., Bischoff ave., Northrup, brick, to Webb-Kunze Construction Co., \$15,170; Elliott ave., University st., Herbert st., brick, to Skrainka Construction Co., \$10,515; Glasgow ave., Dodder st., Parnell st., brick, to John McMahon, \$25,077; Forest ave., Manchester ave., Plateau ave., brick, to Skrainka Construction Co., \$19,576; Pennsylvania ave., Miami st., Potomac st., brick, to Wm. R. Bush Construction Co., \$4,913; Louisiana ave., Eller st., Neosho st., brick, to Ruecking Construction Co., \$23,636; 19th st., North Market st., St. Louis ave., brick, to William R. Redemeyer, \$13,282; 8th st., Biddle st., Cass ave., brick, to William R. Bush Construction Co., \$11,465.70; 10th st., Biddle st., Cass ave., brick, to William R. Bush Construction Co., \$11,300; 11th st., Biddle st., Cass ave., brick, same, \$9,464; Biddle st., Broadway, 7th st., brick, to Skrainka Construction Co., \$4,870; 13th st., Franklin st., Biddle st., same, \$10,411; 7th st., Biddle st., Cass ave., brick, to William R. Bush Construction Co., \$10,895; Grand, Kingshighway, Kingshighway Southwest, Bates st., telford, to G. Evermann & Bro., \$24,972; Grand ave., Bates st., Neosho st., telford, to Ruecking Construction Co., \$30,323; Habsburger ave., Salzburger ave., Gravois ave., telford, to Harry F. Heman, \$4,526; North Market st., Kingshighway Blvd., Union Blvd., bitulithic, to Granite Bituminous Paving Co., \$23,293; Mississippi ave., Geyer ave., Lafayette ave., bitulithic, to same, \$8,122; Kingshighway Southwest, Compton ave., Grand Kingshighway, grading and planting trees and shrubbery, to Harry F. Heman, \$9,623.

Jersey City, N. J.—Van Keuren & Sons, macadamizing Winfield ave.; E. M. Mullin & Co., 1-in. pavement, Randolph ave.

Albany, N. Y.—Street improvements as follows: To T. Henry Dumary, Morris st., and Myrtle ave., \$23,954; to Mulderry Bros., for improving West Lawrence st., \$14,385.

Rochester, N. Y.—By Board of Contract and Supply, Brinker st. asphalt, pavement, to Rochester Vulcanite Paving Co., \$2,106; Van st. asphalt, to Julius Frederick Co., \$1,990; Smith st. Medina block, to H. N. Cowles, \$9,260; Davis st. brick, to Haganman, Miller & Haganman, \$9,971; Weaver st. brick, to Julius Frederick Co., \$18,308; Marsh st. sewer, walks and grading, to Julius Frederick Co., \$2,476.75; Alameda st. walks, to John J. Regan, \$966.35; Marion st. walks, to Henry Schoenfeldt, \$385.35; Park View walks, to William Margrander, \$324.75; Chamberlain st. sewer, to Henry Schoenfeldt, \$25.50; Magnolia st. brick pavement, to Rochester Vulcanite Paving Co., \$27,277.

Akron, O.—By County Commissioners, for bridge on 4th st., Barberton; O. B. France, lowest bidder, on substructure, at \$1,516.15; the Burger Iron Co. was the lowest bidder on the superstructure at \$1,379.

Beach City, O.—Vit. block paving on gravel foundation, Main and West sts., to Burd & Downs, Canton, \$12,196.

Caldwell, O.—To Kissner Constructing Co. of Coshocton, for about 7,750 sq. yds. of paving and 4,500 lin. ft. of curb, \$1.15 per sq. yd. for vit. brick, sand filler, gravel foundation, and 40c. per ft. for Berea sandstone curb.—S. G. Brown, City Engineer.

Columbus, O.—Wm. Graham, New First National Bank Bldg., for paving Schiller st. for \$47,147.

Dayton, O.—Frank Tejan, city, Oakwood State Aid road, \$11,580.

Delaware, O.—Paving of North Sandusky st., to Lambert Bros. & Wirt, Delaware, B'g Four block, \$29,856.

Hobson, O.—Harding & Knisely, New Philadelphia, grading and paving 1½ miles State Aid road in Fairfield Township, at \$18,348.60, the lowest of eight bids.

Millersburg, O.—To Lee & Griggs, city, for extending Millersburg and Nashville State Aid road, \$11,543.

Klamath Falls, Ore.—Warren Construction Co., bitulithic pavement.

Portland, Ore.—Street improvements, to Oregon Hassam Paving Co., Kerby st., E. 10th st. and E. 9th st., \$69,671; to Warren Construction Co., E. 27th st., \$70,014.

Chester, Pa.—Barber Asphalt Paving Co., Dupont st., asphalt, \$2.08 per sq. yd.; Messrs. Hanna bid \$2.16 per sq. yd. for Grafton blocks and \$2.20 for Mack block.

Wilkes-Barre, Pa.—Paving Stanley st., 3,000 sq. yds., with asphalt, to the Warner-Quinlan Co., at \$2.12 per sq. yd.; curbing, 73c. a ft.; bids on brick ranged from \$2.05 to \$2.35 per sq. ft., the bidders being J. Gilligan & Co. and Dunn & Gotthold; the bids for curbing were 75c. a ft. for red stone and 62c. for Wainwright curb.

Westerly, R. I.—John Britton, two miles State road beginning at Potter Hill bridge.

Knoxville, Tenn.—Grading 3d st., Robert Davis; laying sidewalk on Lovenia st., Andy Smith.

Memphis, Tenn.—To Memphis Asphalt and Paving Co., for resurfacing 23,000 sq. yds. of brick paving with asphalt, about \$34,000.

Dallas, Tex.—D. J. Griggsby, resurfacing with creosoted pine, \$2.39 per sq. yd.

Longview, Tex.—To Texas Grading Co., for paving with brick and macadam business section, \$60,000.

San Angelo, Tex.—Roach & Stanzell, Memphis, Tenn., grade fifty miles of Orient roadbed west of Mertzon; this leaves only a stretch of about thirty-five miles not contracted for, between San Angelo and Fort Stockton.

Provo, Utah.—Constructing cement sidewalks in extension No. 4, District No. 11, to the Wheelwright Construction Co., Ogden, \$12,300 for sidewalks and \$1,000 for grading.

Chehalis, Wash.—Paving with bitulithic portions of Pacific ave., Main, Cascade, Market and Folsom sts., to Warren Construction Co., Portland, \$91,100.

Olympia, Wash.—State Road No. 2581, in Is and County, known as the Langly road, will be improved by the County Commissioners of Island County, the Board's bid being \$1,686.

Spokane, Wash.—Inland Empire Hassam Co., Astor st. paving, \$37,220; Blome Paving Co., 4th ave., Spokane to Howard st., \$50,000; Hassam bid \$41,900; paving McClellan st., 9th to Grand bld., and on 9th to Grand bld., Blome, successful bid, \$15,000; Hassam bid \$13,280; grading, curbing, parking and sidewalk 9th ave., Havana to Freya st., estimate \$17,600; to Colley & Ferguson, only bidder, \$18,100; same on Pratt, Howard to Freya, estimate \$11,200; to Colley & Ferguson, only bidder, \$11,860; same on 13th, Crestline to Napa, estimate \$4,850; to Colley & Ferguson, lowest of two bidders, \$5,355; same on Adams st., Wabash to Garland ave., estimate \$12,700; seven bidders, Massie Bros. & Lang, lowest, at \$10,745; same on Cook st., Sprague to 8th ave., estimate \$14,400; to C. M. Payne, lowest of six bidders, for \$12,893; same on 8th ave., Freya to Howard st., estimate \$8,600; to Colley & Ferguson, lowest of two, at \$8,850; same on Denver st., Newark to Celesta, estimate \$4,000; to Colley & Ferguson, lowest of three bidders, at \$4,780; same on Freya st., 5th to 13th ave., estimate \$11,600; to Mitchell Bros., lowest of two bidders, at \$10,995; improving 11th ave. court, Bryant to a point 365 ft. east, estimate \$530; to E. A. Crosswell, lowest of three bidders, at \$450; paving Division with concrete, Blome specifications, Sprague to 4th, estimate \$24,300; to John Fife at \$24,000; Hassam bid \$24,000; Blome bid \$30,000; paving Browne st. with concrete, Blome specifications, 2d to 4th, estimate \$8,900; to John Fife at \$8,600; Blome bid \$10,000; Hassam bid \$8,750; paving Broadway with asphalt, Chestnut to Cochran sts., estimate \$10,700; to In-

dependent Asphalt Co., lowest of two, at \$9,877; paving Stevens with concrete, Blome specifications, 2d to 7th aves., estimate \$28,000; to John Fife at \$30,000; Blome bid \$33,345; Hassam bid \$27,940.

Marinette, Wis.—John Magnuson, paving six blocks, \$8,563.55.

Brampton, Ont., Can.—Construction of 7,200 sq. yds. of macadam roadway, to John Conn, Windsor, 88c. per yd.; grading, to same, 39c. per sq. yd.

Foam Lake, Sask., Can.—To C. H. Conery and C. Mattaini, Guelph, Ont., for construction of 13,000 sq. ft. of concrete sidewalk, 16c. per sq. ft. for walks and 63c. per lin. ft. for curb.

Prince Rupert, B. C., Can.—To Westholme Lumber Co., 1,000,000 ft. of lumber for sidewalks, \$15,000.

Ottawa, Ont., Can.—To Ottawa Construction Co., for surfacing in asphaltic mixture drives leading to and from the House of Commons, 65c. per yd.

BIDS RECEIVED

Sacramento, Cal.—Clark & Henry only bidders for constructing and paving with asphalt Upper Stockton road; cost \$27,500.

Washington, D. C.—Grading Everts st., between 20th and 22d sts., N. E.; E. G. Gummel, Washington, 74c. per cu. yd.; George Hymen, Washington, 47c. per cu. yd.

Marion, Ind.—Bids for paving West 2d st. have been received as follows: Michaels & Minnich, Culver, Metropolitan or Nelsonville block, pioneer asphalt filler, \$5.97; tar filler, \$5.90; concrete filler, \$5.60; sand filler, \$3.30; Dillard Artis, Terre Haute vit. brick, asphalt filler, \$6.05; tar filler, \$5.95; cement filler, \$5.78; sand filler, \$5.50; with 2½c. additional for any other variety of block; William Yates, Metropolitan block, asphalt filler, \$5.86; coal tar filler, \$5.76; cement filler, \$5.64; sand filler, \$5.52; with \$50 less for Culver block.

Baltimore, Md.—Improving Harford, Belair and Liberty roads, Garrison ave., sheet asphalt from Walbrook Junction to Buck's lane, 1½ miles, to Monroe Paving Co., \$114,063; Liberty road, continuation of Garrison ave. from Buck's lane for one mile into Baltimore County, pitch macadam, to P. Flanagan & Sons, \$13,165; Harford road, vit. brick for section from North ave. to Atlantic ave., to P. Flanagan & Sons, \$146,293; continuation of same road over Herring Run, to Warren Bros., \$106,178 for same material and a further charge of either \$60,752 or \$39,950, according to the nature of the bridge selected to span Herring Run; Belair road, pitch macadam, to E. P. Lindsay, \$58,461 for 3 41-100 miles of road, from the city limits; Cecil County, Trap rock road from Elkton to Singlerly, to E. M. Fresch, \$21,183, on condition of adjustment of some charges.

Boston, Mass.—Paving between rails of crane track, Navy Yard: C. M. Leach, box 2285, city, 20c., \$3,000 alternate bid; James P. Timulty, 6 Beacon st., city, 22c.; Worcester Paving Co., Worcester, 29c.; John McCourt & Co., 46 Wait st., city, \$3,683; C. W. Doloff & Co., 20 Central st., city, 20c.; M. McManus Contracting Co., 414 Wood st., Philadelphia, 21c.; Warren Bros. Co., 59 Temple pl., city, 17c.; John F. Coleman, Coleman Bros., Chelsea, 22c.; Jones & Meehan, 10 State st., city, 17c.

St. Paul, Minn.—Paving Dayton ave., Alex Van Houton, Minneapolis, creosoted block, \$46,096; concrete foundation, \$4.25 per cu. yd.; Fielding & Shepley, \$52,734.20, \$5.35; O'Neill & Preston, \$58,000, \$7.10; P. J. Ryan, \$53,480, \$5.90; Thornton Bros., \$53,084, \$6.75; Kettle River Co., for 3½-in. blocks, \$58,765; concrete, \$5.65 per cu. yd.; General Contracting Co., paving with asphalt, \$41,539.

Kansas City, Mo.—Grading portion of Main st., W. C. Mullins, 3018 E. 8th st., \$150,238; McTernan & Halpin Construction Co., 27th and Walnut sts., \$223,708, and Spicantfsky & Wagner, \$140,230.

New York, N. Y.—Paving with asphalt block on a concrete foundation, Concord ave., from 149th st. to 152d st., and setting curb, lowest bidder Hastings Pavement Co., as follows: 3,325 sq. yds. asphalt block pavement, \$1.68; 541 cu. yds. concrete, including mortar bed, \$5.92; 400 lin. ft. new curb, \$1. and 1,550 lin. ft. old curb, re-joined, recut on top and reset in concrete, 35c.; total \$9,731; Barber Asphalt Co. bid \$10,223; furnishing materials and reconstructing roadway of Eastern bld. in Pelham Bay Park, including surfacing with asphaltic earth mixture, from a point 400 ft. north of Split Rock road to northerly approach of new bridge over Eastchester Bay, and from southerly approach of said bridge to southerly boundary of Pelham Bay Park, (a) price per sq. yd., (b) tota: Applian Paving and Construction Co., 261 Broadway, (a) \$1.23, (b) \$4.895; Barber Asphalt Paving Co., 30 Church st., (a) \$1.24½, (b) \$45,442; Cranford Co., 52 9th st., Brooklyn, (a) \$1.35, (b) \$49,275; Eastern Asphalt Paving Co., 115 Broadway, (a)

\$1.20, (b) \$43,800; Sicilian Asphalt Paving Co., 41 Park Row, (a) 93c., (b) \$33,946; Uvalde Asphalt Co., 1 Broadway, (a) \$1.28, (b) \$46,720.

Utica, N. Y.—Barber Asphalt Paving Co. submitted proposals for paving as follows: Roberts st., from Fay st. to the dividing line of the Third and Ninth Wards, with natural stone curbs and walks, \$1,778; with artificial stone curb and walks, \$1,644.20; Roberts st., from Lincoln ave. to dividing line between the Third and Ninth Wards, with natural stone curb and walks, \$1,231.80; with artificial stone curb and walks, \$1,106.40; Elm st., with natural stone curb and walks, \$3,269; with artificial, \$7,447.20.

Dallas, Tex.—Bids were opened and referred as follows: Repair Elm st. paving, Central ave. to Crowds st., Texas Bitulithic Co., removing asphalt, 10c. per sq. yd.; repairing surface, \$1.40 per sq. yd.; new concrete base where necessary, \$1, and surfacing, \$1.50 per sq. yd.; Municipal Paving Co., reconcreting where needed, \$1 per sq. yd.; where resurfacing is in blocks of 100 sq. yds. or more, 75c. per sq. yd. will be the charge. The two bidders made the same offer for like work on McKinney ave. from Harwood to Routh; Street Commissioner William Doran estimates that 60 per cent. of the Elm st. surface and 50 per cent. on McKinney is in good repair. For curb and gutter of concrete on Rawlins st., between Oak Lawn and Throckmorton: Dallas Paving Co., straight curb, 38c. per ft.; combination curb and gutter, 55c.; gutter, 30c.; W. H. Cramer, combination, 55c.; gutter, 28c.; Dallas Hydraulic Brick & Stone Co., combination, 55c.; gutter, 25c.

SEWERAGE

Athens, Ala.—Citizens have voted \$7,500 bonds for sewer and water works construction.

Uniontown, Ala.—Prof. E. B. Kay, of the University of Alabama, Tuscaloosa, is preparing plans for a \$10,000 sewer system.—J. L. Pipe, City Clerk.

Newport, Ark.—Contract will soon be let for construction of sewer system.

Los Gatos, Cal.—Ground has been secured for a sewage disposal plant.

Oakland, Cal.—Bids are invited for the construction of a sewer on Fallon st., from 14th to 19th sts.

Pasadena, Cal.—City Engineer Van Arnum recommended, and Council approved, that sewers be built on California st. for a distance of 1,010 ft. west from Hill ave., and along parts of Mentor, Luverne, Rio Grande, Denver, Elizabeth, Topeka and Atchison; resolutions were read for the first time ordering a sewer on parts of Catalina, Wilson, Stevenson, Michigan, Bell, Claremont and Washington st. and on a part of California st.

Willows, Cal.—City Trustees are considering issuance of \$30,000 bonds for the construction of sewers in outlying districts.

New Haven, Conn.—Petitions for a number of sewers will be acted on.

Windsor Locks, Conn.—Sum of \$500 has been appropriated for plans for a sewerage system.

Aledo, Ill.—City is considering the construction of extensions to the present sewer system; bids will be asked in about 20 days.—W. D. Emerson, City Clerk.

Barrington, Ill.—City is considering construction of sewer; cost \$40,000; bids will be asked about Sept. 1.—William B. Ewing, City Engineer.

Madison, Ill.—Plans and specifications are about completed for an outlet sewer, complete lateral sewer and pumping station; bids will be asked during the fall.—B. H. Colby, Security Bldg., St. Louis, Mo., Engineer; C. A. Ulfers, Village Clerk.

Princeton, Ill.—W. S. Shields, of Chicago, has prepared plans for new sewers to cost \$33,600.—J. M. Farrell, City Clerk.

West Dundee, Ill.—E. K. Wilson, Sherwin Bldg., Elgin, has prepared plans for a system of pipe sewers; cost \$12,000.

Evansville, Ind.—Resolution passed for sewer in 7th and Bell sts.

Terre Haute, Ind.—Bids will be received Aug. 5 for \$40,000 sewer bonds.—L. G. Hughes, City Comptroller.

Columbus Junction, Ia.—City is considering the construction of sewerage work; cost \$4,000; bids will be asked soon.—M. D. Haupt, City Clerk.

Corydon, Ia.—City is considering construction of sewers and water works system.—Charles P. Chase, Clinton, Engineer.

Dubuque, Ia.—City is considering construction of several sewers and streets; cost \$50,000.—Charles Baumgartner, City Engineer.

Iowa Falls, Ia.—The construction of a sanitary sewer to cost \$5,000 is under consideration.—Frank Truman, City Engineer.

Missouri Valley, Ia.—City is considering the construction of sewer system; cost \$25,000.—J. S. Wattles, City Engineer.

Hutchinson, Kan.—City Engineer McLane has completed plans for Severance st. drain; it will have a rectangular section.

Georgetown, Ky.—Citizens in Payne addition are circulating a petition to Council asking that they be given a sewerage system for their community to connect with the regular city system; they propose to the city to pay one-half the cost of the work and material.

Louisville, Ky.—Preston st. sewer will be rebuilt.

Lake Charles, La.—Sewerage Board expects to sell \$160,000 sewer bonds and let contracts within six weeks.

Amherst, Mass.—Selectmen have approved plans for disposal of sewage of East and Dana st. sewers; cost about \$10,000.

Lowell, Mass.—Sum of \$2,050 has been appropriated for drainage system for the North Common.

Ahmeek, Mich.—Plans have been completed for sewer system.

Hubbell, Mich.—Donald M. Scott is preparing plans for improvements to the sewer system.

Lake Linden, Mich.—Council is considering extension of sewer system.

Carrington, Minn.—Plans and specifications are being prepared by L. P. Wolff, St. Paul, for construction of a sewer system, including septic tank.

Glen Cove, L. I., N. Y.—William B. Fuller, 150 Nassau st., New York, has prepared plans for proposed sewer system.

Schenectady, N. Y.—Council is considering construction of sanitary sewers on five streets and surface water sewers in the Boulevard and State st.

Schenectady, N. Y.—Petition received for sewer in Elder st.

Yorkville, N. Y.—Plans for half-mile of 8 and 10-in. sewer have been completed.

Dayton, O.—Dayton Savings and Trust Co. has purchased \$6,700 storm sewer bonds.

Zanesville, O.—City Engineer Harris has completed plans and specifications for four storm sewers in Blue and Luck aves. and Vine st., to cost in all about \$27,400.

Harrisburg, Pa.—Ordinance for building 13 miles of sewers has been passed.

Media, Pa.—Inspector R. S. Hansbury, of the State Board of Health, will visit Media and investigate the conditions in the borough; Media does not have a system of underground sewerage.

Meadville, Pa.—City Engineer has been asked to estimate cost of storm sewers on streets likely to be paved in the next year or two.

Philadelphia, Pa.—Council has voted \$35,000 for repairs to sewers and inlets.

West Chester, Pa.—Property owners are now favoring expenditure of about \$34,000 on a sewer system suggested by Engineer Damon, by which the present sewers may be used as a part of sewerage system.

Woodlawn, Pa.—Citizens have voted \$100,000 bonds for a sewer system, sewage disposal plant and grading of several streets.

Providence, R. I.—Commissioner of Public Works W. F. Slade is considering plans for extending sewer system on the east side.

Sumter, S. C.—Council has instructed the City Engineer to prepare plans for a new main line of sewers for western side of town.

McKinney, Tex.—Council has ordered additional sewer construction.

Snohomish, Wash.—Sub-sewer District No. 10 has been organized.

Kennewick, Wash.—Contract will be let this fall for sewers to cost about \$85,000.—H. Day Hanford, Seattle, Engineer.

Peterboro, Ont., Can.—Chipman & Power, Consulting Engineers, Toronto, are preparing plans for sewerage in the south end; tenders to include sewer construction, pumping station, machinery, etc., will soon be called.—T. S. Hay, City Engineer.

Moosejaw, Sask., Can.—Citizens have voted \$375,000 sewer and water works extension bonds.

Swift Current, Sask., Can.—By-laws for sewerage, sewage disposal and water supply have been carried.—J. Darlington Whitmore, Regina, Engineer.

Lethbridge, Alta., Can.—Citizens have voted \$148,000 sewer and water bonds.

Prince Albert, Sask., Can.—City Engineer Creighton has submitted plans for a trunk sewer; cost \$94,994; construction will start as soon as the Provincial Health Department approves.

CONTRACTS AWARDED

Tuscaloosa, Ala.—Gurley & Co., for the additional sewer extensions.

Pasadena, Cal.—Andrew Holloway, new septic tank, \$16,250.

San Francisco, Cal.—To Metropolis Construction Co., 24 California st., for constructing sewer on 4th and Kentucky sts., from Channel st. south, \$23,182; to same company for constructing 77th st. sewer of reinforced concrete, \$159,512.

Pella, Ia.—Sewers: To C. H. Cathro Co., Omaha, for six miles of 8 to 15-in. pipe sewers, \$16,968, and to W. D. Yager & Co.,

Cedar Rapids, for disposal plant, \$7,965.—Iowa Engineering Co., Clinton, Engineers.

Canton, Ill.—Laying 8-in. sewer in Fulton pl., to Charles H. Whenner and Ed Quillian, 96c. per lin. ft. and \$29 each for manholes.

Connersville, Ind.—To Boots & Gant for construction of storm sewer drains, manholes, etc., in Columbia and Illinois aves.; 12-in. sewer, 47c. per lin. ft., manholes \$30 each, and inlet connections 50c. per lin. ft.

Elkhart, Ind.—Sewers: Northern Constr. Co., Elkhart ave., \$16,623.60, and Kilbourn st., \$1398.10; J. M. Fishby, Gordon st., \$333.80.

Vincennes, Ind.—Building sewers through Niblack levee in Busseron township., to W. H. Moore, \$1,641.

Herington, Kan.—J. W. Kelso, Iola, sewerage system, \$53,241.95; there were 12 bidders, prices ranging up to \$58,938.53.

Topeka, Kan.—McCartney & Daily, sewer No. 30, \$649.

Attleboro, Mass.—Contract B, 11,150 lin. ft. of 30-in. concrete sewer, 240 lin. ft. 20 and 30-in. c.-i. pipe, and 45 brick manholes, to Bruno & Pettitt, Boston, \$58,876; contract C, 3,600 lin. ft. of 30-in. concrete sewer, \$2,460 lin. ft. of 30-in. c.-i. pipe and 23 brick manholes, to same contractors, \$33,189.

Boston, Mass.—To Wm. J. Barry, for constructing Section 7 of Stony Brook conduit, West Roxbury, \$75,326.

Milan, Mich.—Constructing 1st, 2d and Church st. sewers, to Louis Jagnow, Jackson, \$2,375.

Glasgow, Mont.—Constructing sewer system, to Geo. W. Kemper, Minot, 360 ft. 10-in. pipe sewer, \$140; 1,970 ft. 12-in., \$1.85; 1,952 ft. 15-in., \$2.50; 777 ft. 18-in., \$3.10; 1,105 ft. 20-in., \$3.55; 550 ft. 27-in., \$5.85; 18 5-ft. manholes, \$65 each; 27 catch basins, \$75 each; two flush tanks, \$175; concrete outfall, \$300; total \$22,247; totals of other bids, Gil. W. Haggart, Fargo, N. D., \$22,913; Tanner Bros., Minneapolis, Minn., \$24,869; Jas. Kennedy, Fargo, N. D., \$22,820; W. D. Lovell, Minneapolis, Minn., \$22,601.—E. S. Severance, City Engineer.

Bayonne, N. J.—Building sewer and water extensions on Ave. B, to Frank B. Eddy, \$301.50 and \$958.20.

Fulton, N. Y.—To Swift & Hookway, Syracuse, for construction of the laterals to west side sewer system, \$16,353.

New York, N. Y.—O'Leary & Flannagan, 245 E. 202d st., for construction of sewers in Northern ave., between 181st st. and 190th st., \$41,248.

Lakewood, O.—Constructing Donald ave. sewer, to A. J. Galvin, 457 Lenox Bldg., Cleveland, \$3,020.

Minerva, O.—Constructing 2-ft. sewer from intersection of Line and Liberty sts., to Clear Fork of Big Sandy Creek, to W. J. McGinty, city.

Chattanooga, Tenn.—H. S. Bos'ler, sewage pumping station.

Dallas, Tex.—To Joe B. Winslett, Jr., & Co., 6-in. sanitary sewer in Madison st., Oak Cliff, 6 blocks, \$1,299; also another near Jefferson and Polk sts., Oak Cliff, \$803.

Spokane, Wash.—Sewer in alley between Sinto and Sharp, Addison to Perry, to John Fife, lowest of five, at \$6,044; bids for a number of other sewers were rejected.

Hamilton, Ont., Can.—To J. J. Armstrong, for sewers in following streets: Barton, 47c. per ft.; Simcoe st., 44c., and Fife st., 60c.

BIDS RECEIVED

Elkhart, Ind.—Constructing sewers on Elkhart ave., Northern Construction Co., city, lowest bidder, \$16,624.

Newark, N. J.—Building 1,050 ft. of 4-ft. reinforced concrete sewer on S. Orange ave., Jos. Befono & Co., lowest bidder, \$5.40 per ft.; same company also lowest bidder at \$3.98 per ft. for 24-in. sewer on Springfield ave., in Milburn; Jas. T. Boylan lowest bidder for 1,300 ft. of 24-in. stone-ware pipe sewer on Westville ave., Caldwell, \$1.09 per ft.

Hamilton, O.—Storm sewers, 4th, Butler and Center sts., Garver Bros., \$2,398.45; Wirtz & Truick, \$2,628.40; W. H. Louthan, \$2,685.87; Shuler ave., Bender and Grand blvd., Garver Bros., \$5,260.85; Wirtz & Truick, \$5,407.50; W. H. Louthan, \$6,132.75; Vine and 9th sts. and Greenwood ave., Garver Bros., \$7,756.

Mars, Pa.—Constructing vit. pipe sewers, requiring about 11,015 lin. ft. 8-in., 27,000 lin. ft. 10-in. sewer, including flush tanks, manholes, etc., from plans of L. D. Tracy, 245 4th ave., Pittsburgh: Burns Bros., New Castle, \$24,776; Maynard & Flynn, Pittsburgh, \$23,470; N. J. Boyer, Butler, \$24,500; Tony Modella, Pittsburgh, \$23,333; John Arigo, Pittsburgh, \$32,771; Neland & Daly, Pittsburgh, \$19,300; W. Jauss, Pittsburgh, \$21,000.

Outremont, Que., Can.—Tenders for sewers have been received as follows: R. T. Smith & Co., Montreal, \$1,928.50; W. G. McDonald, \$2,434; W. Duquette, Montreal, \$1,169.01; M. Lapointe, Montreal, \$1,183.

WATER SUPPLY

Athens, Ala.—Citizens have voted \$7,500 of bonds for water works and sewer construction.

Hamburg, Ark.—Improvement District Commissioners have selected site east of the A. L. & G. R. R. depot for light and water plant.

Lodi, Cal.—City Trustees are planning to build an entire new pumping plant to take the place of the one now in use; two large gasoline engines with a capacity of 100 h. p. each will be provided in case of breakdowns in either the pumping plant or the electric light plant.

Los Angeles, Cal.—The city has completed arrangements for marketing \$1,530,000 Owens River bonds and receive the money immediately.

North Pasadena, Cal.—The water company will install electric pumps.

Oceanside, Cal.—An election will soon be held to vote on issuing \$15,000 bonds for replacing 8,000 ft. of wooden mains with c.-i. pipe.

Santa Barbara, Cal.—An election will probably soon be held to vote on issuing \$200,000 bonds for completing the water tunnel.

Vallejo, Cal.—Election will be held for \$90,000 bonds for water works and \$75,000 for city hall and county jail.

Clinton, Col.—Geo. W. Thompson is interested in construction of water works.

Kewanee, Ill.—An election will probably soon be held to vote on issuing \$60,000 bonds for water works.

Rockford, Ill.—John W. Alvord, Chicago; B. H. Maury, Peoria, and Daniel W. Mead, Madison, Wis., have been selected to examine water works and report necessary improvements.

Roanoke, Ind.—An election will be held for pumping station for fire protection.

Elisworth, Ia.—Citizens have voted \$65,000 bonds for construction of water works.

Sioux City, Ia.—F. W. Cappelen, of Minneapolis, Minn., will probably prepare plans for improvements to the water system at Morning Side, to cost about \$30,000.—Keyes C. Gaynor, City Engineer.

Louisville, Ky.—No bids were received for \$500,000 water works bonds.

Williamsport, Md.—A water company will be organized and a franchise asked for by E. W. Byron, M. E. Cullen and others.

Dalton, Mass.—Fire District has decided to take water from the Cady Brook in Hinsdale for increased water supply; also to construct dams, lay pipes, etc., and to issue about \$50,000 bonds for the purpose.

Iron River, Mich.—Citizens have voted \$10,000 bonds to enlarge the water works.

Eveleth, Minn.—Council is considering the construction of a new city pumping station and installing new water mains.

Camden, N. J.—City Council's Water Committee has selected Wm. H. Boardman, 426 Walnut st., Philadelphia, Pa., as Consulting Engineer for the proposed auxiliary water plant; cost about \$400,000.

South Amboy, N. J.—About 450 ft. of main will be laid to carry water to Morgan Heights.

Elmira, N. Y.—The Elmira Water, Light and Railroad Co. is planning improvements that will cost about \$500,000; these include two reservoirs, 100,000,000-gals. capacity each; extensive renewal of mains; the work will require three years to complete.

Schenectady, N. Y.—Council is considering construction of water mains in five streets.

Silver Springs, N. Y.—Citizens have voted \$14,000 bonds for new well and pumping station.

Fairview, Okla.—Bids will be received about Sept. 1 for water works improvements to cost about \$40,000.—J. N. Voorhees, City Clerk.

Foss, Okla.—W. H. Kennedy, installing water works, \$25,000.

Fawngrove, Pa.—A water company will be organized to supply the vicinity; capital \$5,000.

Harrisburg, Pa.—Water Department has been authorized to place pipes in Berryhill and Wallace sts.

Philadelphia, Pa.—Council has voted \$300,000 for completion of high-pressure fire service in northeast mill district, and \$250,000 for League Island Park.

Somerset, Pa.—Town proposes to sink four wells to a depth of about 40 ft. in the white sand rock, where an artesian stream of water has been located; citizens will be asked to issue \$12,000 bonds to pipe the water and install a meter system.—L. E. Chapin, Pittsburgh, Engineer.

Chattanooga, Tenn.—The City Water Co. will lay some large mains.

Ablene, Tex.—City has voted on issue of \$7,000 bonds for laying an 8-in. water main in the business section.

Dallas, Tex.—Specifications have been adopted by Board of Municipal Commissioners for new deep well for Oak Cliff.

Temple, Tex.—Water Commission has decided on several miles of extension of water mains, mostly in north part of the city.

Winters, Tex.—City is considering election on \$20,000 bonds for waterworks.

Murray, Utah.—Bonds, \$20,000, have been voted; work will begin immediately upon the installation of a pipe line from a tract of land in Big Cottonwood, where a number of valuable flowing wells have been driven by the city. These wells flow about 600 gallons per minute; a concrete reservoir is contemplated to hold 50,000 gallons of water.

Camas, Wash.—W. C. Elliott, city, has completed for Council plans for a gravity system of water works, and estimates the cost at \$50,000, including two intakes.

Hilliard, Wash.—Plans for a reservoir of 1,500,000 gals. capacity are under consideration.

Snodhomish, Wash.—Council has taken preliminary steps for a water works bond election.

Spokane, Wash.—Plans have been made for big water main extensions into the lumber belt and manufacturing districts; cost, \$100,000.

Eau Claire, Wis.—Council has decided to build concrete reservoir near the pumping station for emergency supply; capacity, 400,000 or 500,000 gals.

La Crosse, Wis.—The Water Committee has recommended construction of a complete pumping station, coagulating basins, filter plant, etc.; cost about \$251,000; report submitted by Goodwin & Harper, Kansas City, Mo.

Marshfield, Wis.—Concrete reservoir will be built; cost \$4,000.

Mellen, Wis.—About \$30,000 will be expended for improvements, to include extending mains, installing additional pumps, sinking well, etc. if certain agreements are reached.—A. W. Pribon, General Manager Water and Light Co.

Lethbridge, Alta., Can.—Citizens have voted \$148,000 water and sewer bonds.

Medicine Hat, Alta., Can.—By-law to expend \$45,000 on water works extension will be submitted to ratepayers Aug. 15.

Collingwood, Ont., Can.—By-law will be submitted for authority to spend about \$5,000 on the increase of water supply.—K. S. Macdonnell, Town Engineer.

Moose Jaw, Sask., Can.—Citizens have voted \$375,000 water and sewer extension bonds.

Outlook, Sask., Can.—Ratepayers have passed \$25,000 water works by-law.

CONTRACTS AWARDED

Atlanta, Ga.—To Nichols Construction Co., for constructing two new coagulating basins. \$28,478.

Wrightsville, Ga.—Constructing water works. 220 tons c-i. pipe, to U. S. Cast Iron Pipe Co., \$24.83 per ton; 100,000-gal. tank on tower 92 ft. high, to R. D. Cole Mfg. Co., Newnan, \$4,200; one boiler, 72 in. x 18 ft. with stack, to Casey-Hedges Co., Chattanooga, Tenn., \$1,175; two compound duplex pumps, to Platt Iron Works, Dayton, O., \$1,223; valves and hydrants, to Columbia Iron Works, Chattanooga, Tenn.; constructing reinforced concrete reservoir, pipe laying, etc., to Municipal Engineering and Construction Co., Chattanooga, Tenn., \$4,863; contract for sinking artesian well not yet let.—Arthur Pew, Atlanta, Engineer.

Monticello, Ia.—Building 7,732 ft. 4-in. water mains; pipe, to Massillon Iron Works, Massillon, \$26.95 per ton and 2 3/4 c. per lb. for specials; laying pipe, etc., to M. H. Meridith, West Liberty, 22 1/2 c. per ft.

Bangor, Me.—Filtration plant from plans of James M. Caird, Troy, N. Y., to New York Continental Jewell Filtration Co., 15 Broad st., New York, \$69,120.

New Bedford, Mass.—Patrick McQualle, water works garage, \$4,327.

Donnelly, Minn.—Constructing water works, to Des Moines Bridge and Iron Co., Des Moines, Ia., \$6,490.

Atlantic City, N. J.—Furnishing and installing steam and water pipes, valves and fittings at Absecon pumping station, to W. K. Mitchell & Co., Ellsworth st. and Schuylkill River, Philadelphia, Pa., \$7,450.

New York, N. Y.—Contract 98, for making test-borings expected to require casing deeper than 200 ft. or to attain a total depth greater than 500 ft., aggregating about 10,000 lin. ft., in the Boroughs of Manhattan and Brooklyn: Healey Sewer Machine & Construction Co., 21 Park Row, \$39,175; Sprague & Honwood, \$45,275; Edward Christman, \$53,862; Phoenix Construction Co., \$58,750; Sullivan Machinery Co., \$62,750; John B. Rulan & Co., \$49,675.

Rochester, N. Y.—Water pipe group No. 242, to Ripton & Murray, \$5,062.40; group 243, Nicola Desiderio, \$2,642, and No. 244, \$3,239.50.

Washburn, N. D.—Constructing water works to C. H. Porritt, Fargo, \$17,282.

Graham, Tex.—To New York Continental

Jewell Filtration Co., New York, N. Y., for filters for the new purification works.—John B. Haley, Fort Worth, Consulting Engineer.

Tacoma, Wash.—By County Commissioners, for construction of a new water system at the County Farm near Sumner, to Nevins & McKim, Puyallup, \$3,678.

Hamilton, Ont., Can.—To American Water Softener Co., Mutual Life Bldg., Philadelphia, for water-softening plants for Toronto, Hamilton & Buffalo Ry. Co.

Victoria, B. C., Can.—Supplying 13,000 yds. of sand for filter beds, to Messrs. Simons & Merryman, \$1.10 per yd.

New Westminster, B. C., Can.—Laying Coquitlam pipe line, to Municipal Construction Co., \$108,557.57.

BIDS RECEIVED

Boulder, Col.—Bids opened July 18 for constructing a rubble concrete masonry dam at Albion Lake reservoir have been rejected; city will do the work by force account: Morrison Construction and Mfg. Co., Denver, lowest bidder, as follows: 2,000 cu. yd. common material, excavation, \$1; 1,000 cu. yds. solid rock excavation, \$4; 11,000 bbls. Portland cement, \$3.30; 500 cu. yds. 1:2:4 concrete, \$14; 13,000 cu. yds. cyclopean masonry, \$6; 16 tons reinforcing steel, \$140; 5 tons 24-in. riveted steel pipe, \$3.50; 3.3 tons steel screens bell mouth pipe, \$150; c-i. pipe, \$60 per ton; steel step ladders and steel, \$200 per ton; 1,400 lin. ft. gas pipe rail, 95c.; windows, doors, etc., \$60; 100 lin. ft. 2-in. gas pipe, 25c.; gates, valves, etc.; total, \$135,162.

Sturgis, Mich.—Contract No. 1, brick and concrete water power station building and excavating for a tall race; approximate quantities of principal items, 1,900 cu. yds. excav., 1,100 cu. yds. concrete, 16 tons of steel reinforcing and 70,000 brick; for tall race, 2,000 to 4,000 cu. yds. of excavation: American Engineering & Construction Co., \$33,304, 210 days; Falkenan Electric Construction Co., \$36,804, 180 days; Sand & Gravel Co., \$24,728, 147 working days; Olsen Construction Co., \$19,844, 180 days. Contract 2, concrete multiple arch spillway and an earth embankment: Garden-Callahan Co., \$61,434, 200 days; American Engineering & Construction Co., \$72,060, 210 days; Falkenan Electric Construction Co., \$53,567, 180 days; Sand & Gravel Co., \$43,162, 147 working days; Olsen Construction Co., \$31,212, 180 days. The American Engineering & Construction Co. offered a reduction of \$4,000 on the total of both contracts and the Sand & Gravel Co. a reduction of \$1,200. Principal items for Contract No. 2: 4,500 cu. yds. of excavation, 1,900 cu. yds. of concrete, 23 tons of steel reinforcing; for embankment, 24,000 cu. yds. of fill.

New York, N. Y.—Contract 98, for making test borings, expected to require casing deeper than 200 ft. or to attain a total depth greater than 500 ft., aggregating about 10,000 lin. ft., and the following are the totals of bids received: Healey Sewer Machinery Construction Co., 21 Park Row, \$39,175; Phoenix Construction Co., 41 Park Row, \$58,750; Sullivan Machinery Co., \$62,750; Sprague Henwood, \$45,275; John B. Rulan, \$49,675; Edw. Christman, \$53,862.

Ft. Meade, S. D.—Constructing concrete dam, spillway, valve chambers, etc., in connection with water system at this port, lowest bidder Bartlett & King, Cedar Rapids, Ia., as follows: Earth excavation, 45c. per cu. yd.; rock excavation, \$2 per cu. yd.; riprap, \$2 per cu. yd.; 16-in. c-i. pipe with valves, \$15 per lin. ft.; 12-in. c-i. pipe with valves, \$12.50 per lin. ft.; 4-in. vit. pipe, 75c. per lin. ft., and concrete in place, \$7.80 per cu. yd.; approximate total, \$54,000; other approximate totals, Bartlett & Co., Deadwood, S. D., \$78,000, and Grams & Schummer, Sturgis, \$71,960.

Moncton, N. B., Can.—Tenders for water pipe, Sumner Co., \$1,474.37; Canada Iron Corporation, Ltd., \$1,477.17; D. Y. Stewart & Co., Ltd., \$1,410; Watson, Jack & Co., Montreal, \$1,373.95.

LIGHTING AND POWER

Abbeville, Ala.—The Abbe Light & Power Co., lately incorporated, capital, \$60,000, contemplates construction of an electric power plant for which bids will be called for soon.—James R. Hall, Columbus, Ga., Engineer-in-Charge.

Grannis, Ark.—John P. Logan, A. Coyle and Dr. Melze are interested in organizing company to establish electric light plant.

Alhambra, Cal.—A municipal lighting plant will probably be built, although the Pacific Light and Power Co. has offered an 8 1/2 c. maximum rate.

Berkeley, Cal.—Council has granted 50-year franchise to the Great Western Power Co.

San Bernardino, Cal.—City is considering purchase of present electric lighting system or construction of municipal plant.

San Jacinto, Cal.—A reinforced concrete dam to impound the waters of San Jacinto

River and Strawberry Creek will be constructed on the Domenigoni ranch by local capital; A. H. Koebig, Jr., Broadway Central Bldg., Los Angeles, is surveying the site.

Harrisburg, Ill.—Charter has been granted to Saline County Light and Water Co. to construct, acquire, lease, maintain, extend and operate water works.—A. C. Murray, W. L. Murphy and W. M. Timmons, all connected with McKinley Electric Syndicate, Incorporators.

North Crystal Lake, Ill.—The city will advertise for bids for an electrically connected pump.—Dr. H. D. Hull, President of Commission.

Middletown, Ind.—Citizens have voted to establish an electric light plant.

Yorktown, Ind.—Petitions are being circulated in town asking the Union Traction Co. to install an electric light system.

Belle Plaine, Ia.—H. R. Mosnat has petitioned for franchise for gas plant; about five miles of mains will be laid.

Dexter, Ia.—City is considering the construction of a lighting plant and water system.—E. J. Frum, City Clerk.

Fort Scott, Kan.—Gas and Electric Co. will erect addition to power house on Station st.

McPherson, Kan.—The electric light and water plant was destroyed by fire.

Salina, Kan.—An election will be held Aug. 9 to vote on the approval of the People's Light, Heat and Power Co.'s franchise.

Baltimore, Md.—Plans have been completed by Architects Barker, Thomas & Rice for proposed power house for Bayview Hospital.

Boston, Mass.—Superintendent of Streets Rourke and Finance Commission are discussing street lighting problem and Commission's recommendations that city purchase its own lighting equipment for gas lighting and use its own automatic lighting and extinguishing devices.

Westfield, Mass.—Plans have been completed for \$15,000 addition to the municipal gas plant.

Red Lake Falls, Minn.—Engineers H. M. Byllesby & Co., Chicago, are planning extensive improvements to the electric plant of the Red Lake Falls Electric Light Co.—E. F. Marshall, Vice-President.

Broken Bow, Neb.—The Broken Bow Electric Light Co. has decided to erect a power house.

Pittsfield, N. H.—Pittsfield Light and Power Co. has been incorporated to furnish electricity for light and power; contract has been made with the town to furnish light for five years; C. F. Gardner, Raymond, will have charge of installing proposed steam plant.

Boonville, N. Y.—The proposed dam for the electric light plant will cost about \$25,000; it will be constructed by day's work.—W. G. Stone, Utica, Engineer.

Brooklyn, N. Y.—The Edison Electric Co., 660 Pearl st., will construct \$20,000 substation at 864 Madison st.

Gloversville, N. Y.—The Fulton County Gas and Electric Co. will build high-tension line nine miles in length from Gloversville to Ephrata, requiring 135 steel transmission towers, "A" frame, 46 ft. and 52 ft. in height; brick substation will also be built in this city and generating and distributing equipment installed.—J. B. Hodgson, Superintendent.

Silver Springs, N. Y.—Citizens have voted \$6,000 bonds for electric light plant.

Foss, Okla.—City contemplates the installation of an electric lighting system.

Grandfield, Okla.—E. E. Preston and J. E. Fitzpatrick have petitioned city for franchise to establish electric light plant; estimated cost, \$10,000.

Prineville, Ore.—The Cove Power Co. has been incorporated with a capital of \$50,000, to generate and sell electric power.—W. A. Booth, President.

Harrisburg, Pa.—Eight new arc lights have been ordered placed.

Kennett, Pa.—Local capitalists are talking of starting another light plant.

Reading, Pa.—Consumers Gas Co. has decided to erect new gas holder; cost about \$250,000.

Charleston, S. C.—Mayor R. H. Rhett has appointed a special committee to select engineers to estimate the cost of constructing electric light plant.

Greenville, S. C.—Council has granted to the Home Light & Power Co., Greenville, a 30-year franchise.—A. E. Sussex, City Clerk.

Deadwood, S. D.—The Consolidated Power and Light Co. will purchase an electrically operated pump that will automatically keep water pressure in a building above that of the city main which supplies the water, and do this without the aid of a tank placed in the building.—M. M. Maghee, Assistant General Manager.

Lead, S. D.—Lead-Deadwood Gaslight and Fuel Co. has been granted a franchise by the city.—Alderman Pool, Chairman of Special Committee.

Tacoma, Wash.—An offer of \$250,000 has been made to P. H. Hebb by city for power site on the White River. Address Commissioner Freeland.

Brockville, Ont., Can.—Brockville Light and Power Department has asked tenders for erection of power house adjoining water works pumping station.

CONTRACTS AWARDED

Oakland, Cal.—Rickon-Ehrhart Co., police telegraph fire alarm building, \$44,794.

Strawberry Point, Ia.—Constructing \$15,000 electric light plant to Minneapolis Steel & Machinery Co., Minneapolis, Minn.; the electric work to the Fort Wayne Electric Works, Fort Wayne, Ind.—Oscar Claussen, St. Paul, Minn., Consulting Engineer.

Wichita, Kan.—Constructing a power plant for Kansas Gas and Electric Co., to Deiter & Wenzel Construction Co., city; cost about \$575,000.

Baltimore, Md.—Supplying electric current for street lamps for one year, to Consolidated Gas, Electric Light and Power Co.

Medford, Mass.—Malden Electric Co. for lighting city streets for 10 years; 592 incandescent lamps at \$14.12 each per year, and 162 arc lamps at \$76.63, and also agrees to replace the present 25-cp. incandescent street lamps with 40 cp. tungsten lamps; a reduction in price and for furnishing improved type of lamp or apparatus by the company in the event that another municipality shall make a more advantageous or lower-priced contract with the company is provided for; the contract dates back to March 1 and breaks a previous agreement made July 20, 1907.—F. C. Sargent, Electrical Engineer.

Garoga, N. Y.—The Garoga Water Power and Transmission Co. has awarded to the Empire Engineering Corporation, 60 Wall st., New York City, the contract for hydroelectric plants on Peck Lake and George Lake, including power house, calling for the development of about 20,000 h. p.

BIDS RECEIVED

New York, N. Y.—Furnishing materials and installing electric lighting fixtures in the Metropolitan Museum of Art, located in Central Park, Black & Boyd Mfg. Co., 23 E. 22d st., \$34,300; the Enos Co., 16th st. and 7th ave., \$26,418, and Sterling Bronze Co., 107-113 W. 25th st., \$37,588.

New Hamburg, Ont., Can.—Electrical apparatus: Puddicombe Estate, \$7,560; C. H. Burgess & Co., \$7,464; W. A. McKenzie & Co., \$7,450; Brent Noran & Co., \$7,344; none accepted.—W. Millar, Clerk.

FIRE EQUIPMENT

Long Beach, Cal.—Budget includes \$22,785 for additional station, \$925 for extending fire alarm system, \$1,000 for hose, \$9,000 for auto fire engine and \$200 for repair wagon.

Palo Alto, Cal.—Citizens have voted \$5,000 for purchase of fire truck. F. B. Simpson can be addressed.

Santa Monica, Cal.—City will purchase motor chemical engine.

Willows, Cal.—Citizens will vote on \$25,000 bonds for installation of fire protection equipment and erection of city hall.

Harmon, Ill.—Gasoline engine and additional hose will be purchased.

Silver City, Ia.—Fire department will be organized. Mayor Huffaker can be addressed.

Topeka, Kan.—Fire Chief G. O. Wilmarth has recommended \$20,000 new improvements.

Caldwell, N. J.—Purchase of combination chemical truck has been authorized.

Cumberland, N. J.—Police and Fire Commission will prepare specifications for uniforms for the Fire Department and advertise for bids, the contract to be awarded the lowest bidder; the men are to pay for the uniforms.

Perth Amboy, N. J.—Chief Theodore Anderson has made requisition on Council for 2,500 ft. fire hose.

Corning, N. Y.—North side residents are urging changes in fire alarm system.

La Salle, N. Y.—Citizens have voted to erect fire station and village hall.

Bismarck, N. D.—Need of new apparatus and better quarters is being urged.

Canton, O.—Fire Chief Totten recommends purchase of 1,000 ft. of hose. Address Council Committee Fire and Water.

Mechanicsburg, Pa.—City will organize a fire company.

Northampton, Pa.—Purchase of apparatus is being considered.

Pottstown, Pa.—West End Co. has decided to erect new station.

Reading, Pa.—Liberty Fire Co. will purchase an auto chemical.

Johnson City, Tenn.—Fire underwriters recommend an additional fire station and remodeling of present one.

CONTRACTS AWARDED

Lynn, Mass.—Contracts for equipment of the fire department with Chalmers-Detroit car for Chief, Knox combination chemical and hose auto, and Pope-Hartford squad auto, have been signed by Mayor Rich.—Thomas A. Harris, Chief.

Toronto, Ont., Can.—Fire hall on Main st.: Masonry, Page & Co.; carpentering, M. Hutchinson; heating, W. Schulkins; plumbing, J. E. Gray; electric wiring, W. J. McGuire; roofing, Reggin & Spence; plastering, A. Petrie & Co.; painting and glazing, John Faircloth; total, \$25,238.

BIDS RECEIVED

Indianapolis, Ind.—Automobile patrol wagon and automobile combination hose and chemical wagon, Howe Engine Co., Howe fire wagon, \$4,950; Webb Motor Fire Apparatus Co., St. Louis, Mo., Webb fire wagon, \$4,500; police patrol, \$3,750; Terre Haute Auto Co., Terre Haute, Franklin police patrol, \$3,500; Conduit Automobile Co., Knox fire wagon, \$5,000; Grabowsky Power Wagon Co., Detroit, Mich., Grabowsky fire wagon, \$4,550; police patrol, \$3,000; American-La France Fire Engine Co., Elmira, N. Y., American-La France fire wagon, \$5,150; Gibson Automobile Co., Premier fire wagon, \$4,500; police patrol, \$3,900; Willis-Holcomb Co., Packard fire wagon, \$5,343.60; police patrol, \$4,851.65.

BRIDGES

Sacramento, Cal.—Sacramento & Yolo Counties will build bridge opposite M st.

Danbury, Conn.—County Commissioners have had plans, etc., prepared for new bridge from city to Packer's Island; bids will be received soon.

Griffin, Ga.—Spalding County will vote Aug. 23 on \$50,000 bonds for bridges and roads.

Indianapolis, Ind.—The County Commissioners will soon award the contract for constructing a concrete bridge over Little Eagle Creek at W. Washington st.; estimated cost, \$20,000.

Hutchinson, Kan.—Sum of \$15,000 bridge bonds have been sold.

Louisville, Ky.—Jefferson County and Hardin County will construct wagon bridge across Salt Lake; estimated cost, \$30,000; C. F. Taylor, Louisville, is interested.

Lowell, Mass.—Committee on Streets have recommended a loan of \$20,400 to widen Lawrence st. near the Wamesit Power Co. and to build a new bridge there; also a loan of \$7,800 for new bridge over Billerica st. and rebuilding of bridge in Congress st. at an expense of \$2,200.

Bayside, L. I., N. Y.—Plans have been prepared by Department of Bridges, New York City, for a bridge 48 ft. wide over Little Neck Creek on Broadway; cost \$130,000.

Cincinnati, O.—The City Engineer has completed plans for erection of \$90,000 viaduct at Monmouth, 11th and John sts.

Muskogee, Okla.—Sum of \$100,000 bridge bonds have been voted.

Butler, Pa.—County Commissioners have decided to replace the West st. bridge.

Hazleton, Pa.—Court has approved construction of bridge at Wapwallopen.

Philadelphia, Pa.—Council has appropriated \$50,000 for repairs to bridges and \$90,000 for widening Chestnut st. bridge.

Pittsburg, Pa.—No contract was let June 27 by city for three main piers for the Northside Point bridge, about 16,000 cu. yds. stone and concrete masonry, and the awarding has been postponed indefinitely.—Joseph G. Armstrong, Dir. Dept. Pub. Works.

Washington, Pa.—Cement concrete culvert bricked over will be built to replace two old bridges on S. Main st. Address County Commissioners.

York, Pa.—County Commissioners will advertise at once for bids for the construction of concrete bridge or the reinforcement with concrete of the present College ave. bridge; three weeks will be allowed for contractors to prepare bids.

Clifton Forge, Va.—Council is considering the issuance of \$65,000 bonds for constructing bridges, etc.

New Westminster, B. C., Can.—Ratepayers have passed a \$30,000 bridge by-law.

CONTRACTS AWARDED

Montgomery, Ala.—Hugger Bros., City, for rein. concrete bridge over Central of Ga. R. R. tracks at Madison ave., \$8,400.

San Luis Obispo, Cal.—Constructing bridge over Salinas River at Rector Crossing, to Deacon & Hale, city, \$10,118.

Orange, Conn.—Building bridge over the Wopaug River to Philo Thurman.

Springfield, Ill.—Constructing bridge over Sangamon River near Fellopolis, to Frank R. Miller, 218 N. 1st st., city, \$6,349.

Des Moines, Ia.—The Phee Constr. Co. for constructing viaduct at W. 7th st., \$50,000.

Belair, Md.—By State Road Commission, John M. Tucker, Chairman, Baltimore, at \$14,000, to David E. Evans & Co., 402 Hoffman Bldg., Baltimore, for reinforced concrete bridge near Belair.

Akron, O.—Construction viaduct, to Akron Storage & Contracting Co., Akron, \$21,971; other bidders: Hunt & Wigley, \$28,300; E. J. Lander, Canton, \$25,500; E. W. Parshall, \$26,400; E. McShaffrey, \$26,800.

Cleveland, O.—Baldwin Bros., city, bridge work, per report 2,658, retaining wall, St. Clair road, Euclid Township.

Oklahoma City, Okla.—To Topeka Bridge Co., Topeka, Kan., for constructing steel and concrete bridge over North Canadian River, \$56,000.

Olympia, Wash.—Stevens Creek bridge, in Chehalis County, to W. C. Hiatt, Arlington, \$1,949.

Seattle, Wash.—Constructing W. Garfield st. bridge and plank highway, to C. Geske & Co., \$57,757.

Winnipeg, Man., Can.—Erecting Brown and Brant st. bridge; Piers to Wm. Newman & Co., city, \$54,720; erection of superstructure to Cleveland Bridge and Engineering Co., Darlington, England, \$205,160.

BIDS RECEIVED

San Francisco, Cal.—Ferrolite Co. was low bidder on county jail, \$121,000.

Solon, Me.—By Solon Bridge Committee, G. D. Perkins, Chairman, for furnishing material and constructing superstructure of a 480-ft. steel highway bridge over the Kennebec River, between Solon and Embden; masonry: Reed, Steward & Blunt, first-class masonry, \$18.95; second-class, \$8.95; 1-3-6 concrete under water, \$11.95; above water, \$7.95; 1-2-4 concrete above water, \$14.15; excavation under water, \$1; J. L. Parkin & Son, \$16.50, \$9.60, \$10.50, \$7.50, \$8.50, \$2.25; C. S. Humphreys, 1-3-6 concrete under water, \$10.45; above water, \$9.96; 1-2-4 concrete above water, \$10.85; excavation under water, \$1.49. Superstructure: Penn Bridge Co., Beaver Falls, spans, 240-240 ft., \$17,120; spans, 300 ft.-180 ft., \$19,000; spans, 80 ft.-200 ft.-200 ft., \$15,130; Canton Bridge Co., \$17,600, \$19,300, \$15,265; American Bridge Co., \$20,168, \$21,624, \$17,950; Boston Bridge Works, \$18,980, \$20,083, \$16,498; Pennsylvania Steel Co., spans, 240 ft.-240 ft., \$24,120; contract awarded to J. L. Parkin & Son, Fairfield, Me., for the masonry, and to the Penn Bridge Co., Beaver Falls, for the superstructure, spans 80 ft.-200 ft.-200 ft.

Baltimore, Md.—Raymond Concrete Pile Co., Pratt and Concord sts., city, is low bidder on bridge over Western Maryland R. R. on Poplar Grove ave.

Elmira, N. Y.—Pulford & Dempsey, restoration of city hall, \$31,500; other bids, I. e. Valley, McLeod & Co., \$33,057; W. R. Compton Realty and Building Co., \$33,533.

Berwick, Pa.—For permanent floor on the Berwick-Nescopeck bridge across the Susquehanna River: C. H. Reimard, Bloomsburg, \$26,688; John P. Fooley, Wilkesbarre, \$28,890.

Philadelphia, Pa.—By city for bridge over the Pa. railroad on line of N st.: John McMenamy, \$46,500; Cramp & Co., \$45,778, complete the work in 8 months; American Paving & Construction Co., \$52,700, 9 months; Thomas F. Reilly, \$44,000, 6 months; McNichol Paving & Construction Co., \$48,109, 12 months, and Richard Walsh, \$39,757, 7 months.

Portsmouth, Va.—For bridge over Tanner's Creek, V. M. Johns, \$2,533.66; E. Cross & Son Co., \$2,500 (this bid does not include abutments); Cates Machine and Bridge Co., Burlington, N. C., \$4,500 (this bid is for a steel bridge); the proposed bridge is to be 315 ft. long, 18 ft. wide, with four piles to the bent, not to exceed 45 ft. in length.

MISCELLANEOUS

Birmingham, Ala.—Resolution to purchase 100 park benches for Avondale Park was referred to Mayor, Chairman Finance Committee and Chairman of Park and Lands Committee.

Birmingham, Ala.—Committees have been authorized to purchase two automobiles, one for the Street Commissioner, \$1,250, and City Engineer, \$1,500. Address the Mayor.

Long Beach, Cal.—Council has authorized the issue of \$107,000 bonds for construction of a cement bulkhead, 7,000 ft. long, and a 30-ft. walk on Seaside blvd., from the Virginia Hotel to Seaside Park; it will be probably three months before plans and specifications are ready for figuring.

Santa Monica, Cal.—Two projects for the development of the water front have received the indorsement of the Chamber of Commerce, and bond election will be called soon to provide funds; first plan is for the construction of an ocean promenade 1,000

ft. from the shore, the walk to be 50 ft. wide, resting on concrete piles with the floor 10 ft. above high tide; length of pier to be 3,300 ft. running from the Marine st. pier to the Windward pier; estimated cost \$160,000; second plan comprises the erection of a pier 50 ft. wide, running parallel to the shore and connecting the ends of the Fraser piers, the structure to rest on concrete piles placed 28 ft. apart, and to have a cement surface.

Willows, Cal.—Citizens will vote on \$25,000 bonds for erection of city hall and for installation of fire protection equipment.

St. Petersburg, Fla.—City has postponed date of election on \$7,500 of fire station, jail and fire and police bonds from July 19 to August 30.

Griffin, Ga.—Spalding County will vote Aug. 23 on \$20,000 bonds for improvements to jail.

Canton, Ill.—City will purchase 1,000 metal street signs. Address Council Street Committee.

South Bend, Ind.—Park Commissioners will receive bids for building a concrete wall at Howard Park, along the St. Joseph River, to match the Jefferson boulevard bridge, also a retaining wall at Leeper Park. —Wm. S. Moore, City Engineer.

Jackson, Miss.—Citizens will vote on bond issue to erect town hall and for other municipal improvements.

Marshall, Mo.—City is considering erection of \$30,000 hospital.

Asbury Park, N. J.—Providing voters of city approve, city, through its Public Grounds Commission, will spend \$150,000 for shore front betterments in the near future.

Hoboken, N. J.—Council is considering appropriation of \$100,000 for a combination inland bathhouse and public laundry, together with a children's playroom. —George Gonzales, Mayor.

New York, N. Y.—Dock Commissioner Tomkins is having plans prepared for a dock to accommodate the largest steamers.

Poughkeepsie, N. Y.—Citizens may vote on \$35,000 bond issue for purchase of Vassar Brewery property and preparing same for a municipal dock.

Rochester, N. Y.—The Finance and Law Committee of Council favors the construction of a culvert at Pinnacle ave. to carry city water under the Barge Canal; cost, \$50,000.

Portland, Ore.—Plans are being prepared for erection of public concrete dock at the foot of Stark st.; cost approximately \$15,000.

Erie, Pa.—Chas. Carroll Brown, Indianapolis, Ind., will prepare plans for incinerating plant. —F. Hanlon, City Clerk.

Philadelphia, Pa.—Council has voted \$40,000 for sprinkling macadam streets.

Philadelphia, Pa.—Site will be purchased in 44th Ward for erection of police station.

Pittsburg, Pa.—Bids for parking Memorial Hall property have been rejected as too high by the County Commissioners; plans will be revised and new bids invited.

Corpus Christi, Tex.—Federal Government will dredge channel and city will probably use part of 127,000 cu. yds. to be excavated for filling in behind proposed crescent piling dock. Address Roy Muller, Secretary, Commercial Club.

Dallas, Tex.—Bids for auto ambulance will be called for.

Fort Worth, Tex.—City will purchase a \$3,000 automobile patrol wagon; bids invited at once. —George Mulkey, Police Commissioner.

Salt Lake City, Utah.—Park Commissioners have offered the Playground Association a location in Liberty Park.

Pasco, Wash.—Council is considering erection of \$30,000 city hall.

Puyallup, Wash.—City hall is to be built from proposed bond issue. Address Councilman F. D. Dwight.

Milwaukee, Wis.—City plans to improve buildings of city natatoria. Address Commissioner H. E. Briggs.

Milwaukee, Wis.—Adolph R. Ross, Architect, New York City, won the competition in plans for \$250,000 central police station and criminal court building on Broadway. —Alderman C. L. Wiley, Chairman, Committee on Police.

CONTRACTS AWARDED

Los Angeles, Cal.—Furnishing Hall of Records: California Furniture Co., \$247,990; the bid was nearly \$100,000 more than that of Van Dorn Iron Works for metal furniture.

Oakland, Cal.—Livingston st. wharf: Cotton Bros. & Co., city, low bidder, at \$119,790, but \$198 lower than the next lowest sum named. Bidding on an alternate design, the Thompson Bridge Co., San Francisco, is low, at \$112,000; bids referred to City Attorney and City Engineer.

Peoria, Ill.—Removal of dead animals from streets during year, Union Rendering Co., at \$15 per month; the George Alfs Garbage Co., Ltd., bid \$47.50.

Kansas City, Kan.—By Commissioners of Wyandotte County, for constructing a steel reinforced concrete culvert on the county line, to T. M. Torson, city.

Baltimore, Md.—Disinfecting plant, J. L. Robinson, \$3,753.

Ft. Worth, Tex.—United States Fidelity and Guaranty Co., of Baltimore, contract for bonding city employees for 21c. per \$100, which is the lowest rate ever offered the city.

Salt Lake City, Utah.—Salt Lake & Ogden R. R., renewal, for disposal of city garbage \$8.50 per car and \$12.50 for proposed new steel garbage cars, railroad and city to pay one-half cash for them at loading station.

BIDS RECEIVED

Oakland, Cal.—Construction Livingston st. pier: H. Gould, \$127,219; Mercer-Fraser Co., \$135,000; Healey-Tibbets Constr. Co., \$119,982; Thompson Bridge Co., \$125,000, alternate design, \$112,900; Pacific Constr. Co., \$145,300; Metropolis Constr. Co., \$129,775; Burrell Bridge & Constr. Co., \$131,300; Colton Bros. & Co., \$119,790; the bridge will be 125 ft. wide and 300 ft. long, and will be of reinforced concrete.

Visalia, Cal.—The lowest bid received July 20 for the improvement of Mill Creek, including certain bridge work, was submitted by R. Keatinge & Sons, 693 Mission st., San Francisco, at \$66,512. —Morve L. Weaver, City Engineer.

New York, N. Y.—By Board of Water Supply for contract \$3, furnishing and erecting telephone poles and appurtenances at various localities along the line of the Catskill Aqueduct in Ulster, Orange and Westchester counties. Carpenter & Lindsay, Paterson, N. J., \$10,402; Reliance Engineering Co., \$17,542; Frederick Pierce Co., \$11,230; Frank E. Gore, \$23,075; Lord Electric Co., \$14,574; MacDonald & Gibson, \$20,075; Wormser-Goodman & Co., \$15,612; Geo. M. Painter, \$15,406; East Coast Equipment and Construction Co., \$14,165.

Philadelphia, Pa.—For improvements to Police Tug Ashbridge, John Balzley, \$3,449; John H. Mattis & Co., \$4,063; John H. Dialogue, \$2,930, and Kensington Shipyard Co., \$2,475; two bids for the erection of the bathhouse were received; they were from John R. Wiggins & Co., \$22,900, and John S. Jordan, \$27,000; George B. Cleigh offered a bid of \$2,590 for furnishing the fixtures in the pumping station.

TOO LATE FOR CLASSIFICATION

STREET IMPROVEMENTS

Los Angeles, Cal.—Supervisors are considering election in Glendora road district on special tax to raise \$20,000 for mountain road from Glendora over range into the San Gabriel canyon; distance about nine miles.

Indianapolis, Ind.—Board of Public Works has adopted resolutions for improvement of six streets.

Sullivan, Ind.—Council has ordered building of 10 concrete walks.

Haverhill, Mass.—Improvement of Stage st. is being considered.

Omaha, Neb.—City Engineer's office is planning to advertise for bids on thirty new paving districts which have been recently ordered by Council; none of these will be paved until next year, however, as the paving money is all expended; estimates will be put in so the contracts can be signed Jan. 1, when more money is at hand.

Schenectady, N. Y.—Cost of widening Dock st. has been estimated by City Engineer J. Leland Fitzgerald at \$17,860.

Wilmington, N. C.—Street Commission proposes to commence paving streets some time in October; as yet no special class of paving material has been selected; Commission invites correspondence from the manufacturers of different kinds of paving material, giving information as to the different towns where paving is laid, amount of paving laid in each place and the cost per square yard; Commission would also like to know from the manufacturers where any of the different kinds of material is at present being laid. —Louis S. Belden, Chairman; C. R. Humphreys, Engineer.

Lockland, O.—Plans for paving all village streets have been completed by Council.

Upper Sandusky, O.—Bids will be received Aug. 4 for \$13,000 paving bonds. —Peter Frank, Jr., County Auditor.

Ogden, Utah.—City Engineer submitted plans for sewers, gutters, sidewalks and street paving in Hudson ave., which were adopted by Council and referred to the City Engineer to advertise for bids.

Yakima, Wash.—Commissioners of Yakima County are planning to call election on

\$125,000 bonds for construction of public roads.

Lethbridge, Alta., Can.—City will expend \$35,000 on streets and \$12,000 on steam shovels and equipment.

CONTRACTS AWARDED

Berkeley, Cal.—To Contra Costa Construction Co., for construction of campus roads which will cost \$33,100.

Dundee, Col.—G. Mancinni, for curbing and guttering, \$35,000.

Downer's Grove, Ill.—Grading, draining and paving portions of Gilbert Ave. and Grove st., requiring in all 6300 sq. yd. vitr. brick pvt., 4550 lin. ft. combined concrete curb and gutter, etc., to A. E. Rutledge, Rockford.

East St. Louis, Ill.—Repaving part of Missouri ave. and the laying of 726 lin. ft. of curbing, to J. B. Myers, \$1,809.90; other bidders, Meyers & Thomas, \$1,873.90; J. Keeley, \$1,907.96.

Marion, Ind.—Brick block paving, 7,000 ft., to Oren Simmens, stone curb, \$5.29 per ft., complete; about one mile, to L. C. Lillard, \$5.49 per lin. ft. —A. Y. Stout, County Auditor.

Passaic, N. J.—Construction of storm water sewer in Second and Mercer streets, and to lay brick pavement in Second street, to (A) Union Building & Construction Co., \$31,884.22; (B) De Vogel Con. Co., bid \$32,339.05; and (C) Jas. Maybury & Son, \$28,874.51. —E. N. Kevitt, Chairman, Committee on Streets and Sewers.

	(A)	(B)	(C)
820 24-inch pipe, incl. Y branches.....	\$95	\$1.00	\$3.90
445 20-inch pipe, incl. Y branches.....	.70	.62	.65
287 15-inch pipe, incl. Y branches.....	.45	.48	.45
7 price per catch basin.....	85.00	100.00	115.00
5 price per manhole.....	39.00	60.00	60.00
12 concrete, per cubic yards.....	5.00	6.00	7.00
18 paved gutter (162 square feet).....	.09	.01	.05
56 reset curb.....	.14	.10	.12
284 relaid flagging.....	.05	.01½	.06
697 trench under 8 feet in depth.....	.45	.48	.35
885 trench between 8 and 10 feet in depth.....	.62	.55	.50
6 catch basins to be disconnected and reconnected....	10.00	10.00	35.00
10,620 square yards brick pavement.....	2.70	2.73	2.39
276 Header Curb.....	.60	.50	.75
New curb.....	.60	.50	.55
New flag.....	.19	.16	.17
Total amount.....	\$31,884.22	\$32,339.05	\$28,874.51

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREET IMPROVEMENTS				
Nebraska	Plattsmouth	Aug. 8, 8 p.m.	Furnishing material for curbs and pavements.	W. B. Elster, City Clerk.
Minnesota	Mankato	Aug. 8, 10 a.m.	Bldg. curb and gutter on several streets.	A. H. Scherer, City Clerk.
Minnesota	St. Paul	Aug. 8, 2 p.m.	Grading Edmund st. from Snelling to Aldine.	Board of Public Works.
Minnesota	Virginia	Aug. 9, 8 p.m.	Bldg. cement walks, curb, gutter and alley crossings.	A. E. Bickford, City Clerk.
Wisconsin	Superior	Aug. 10, 2 p.m.	Grading, ditching, turnpiking So. Range and other roads.	County Clerk.
Pennsylvania	Steelton	Aug. 12, 7:30 p.m.	Replacing 6,000 ft. steel-bound granolithic curb, Front st.	Chas. P. Feidt, Boro. Sec'y.
Minnesota	Fairmont	Aug. 15, 11:30 a.m.	Bldg. Sec. 5, State Road No. 1.	H. P. Edwards, County Auditor.
Minnesota	Monterey	Aug. 18, 3 p.m.	Grading State Road No. 2: 15,650 yds. of earth and 11 corrugated and 4 concrete culverts.	County Board, Monterey Hotel.
SEWERAGE				
Illinois	Chicago	Aug. 8, 11 a.m.	Bldg. tile pipe sewers in Central and many other streets.	C. A. V. Standish, Sec'y Bd. Loc. Im.
Kansas	Lawrence	Aug. 8	Bldg. conc. storm sewers, two streets.	F. D. Brooks, City Clerk.
Ohio	Oakley	Aug. 9	Bldg. sewer in Brotherton road.	Oscar Kosche, Village Clerk.
Iowa	Indianola	Aug. 23, 7:30 p.m.	Bldg. sanitary sewers: 6,447 ft. 10-in., 12,087 ft. 8-in. and 1,258 ft. 6-in. standard vit. sewer pipe; 33 common and 13 drop manholes; 9 flush tank siphons, set in manholes; 800 house connections, 328 manhole stops, 1/2 x 10-in. round iron.	A. H. Gilliland, City Engineer.
WATER SUPPLY				
Pennsylvania	Edinboro	Aug. 5, 1 p.m.	Bldg. w. w.: 3 miles 4, 6 and 8-in. pipe, 30 fire hydrants, gate valves, boxes, etc.; pumping station, 2 power pumps, 2 gasoline engines, steel standpipe and base.	R. J. Griswold, Boro. Clerk.
Maryland	Baltimore	Aug. 10, 11 a.m.	Bldg. pump station on South st.	E. D. Preston, Inspector of Bldgs.
New York	Ithaca	Aug. 10, 3:30 p.m.	Furn. 9,000 ft. Class B, 24-in. c-i. pipe, also specials.	Donald F. McLeod, City Engineer.
BRIDGES				
New Jersey	Newark	Aug. 8, 3 p.m.	Bldg. conc. culvert and arch bridge; also extending beam and arch bridge.	Jas. Owen, County Engineer.
Pennsylvania	Bellefonte	Aug. 13	Bldg. 2 steel bridges with rein. concrete floors, College and Union townships; also rein. concrete arch.	Jacob Wooding, Chm. Co. Comrs.
Pennsylvania	York	Aug. 25, 11 a.m.	Removal of present College ave. bridge and erection of entire new one or alteration and repair of present one.	Wm. H. Strine, County Clerk.
Ohio	Athens	Aug. 25	Standpipe, two 150 h.p. hori. tubular boilers and steam piping for improving water supply system at State Hospital.	Dr. O. O. Fordyce, State Hospital.
LIGHTING AND POWER				
Ohio	Hamilton	Aug. 9, noon	Furn. 125 wattmeters for single phase and polyphase alternating current circuits; also wire and line for extension of system.	C. M. Robertson, Clk. Bd. Pub. Serv.
Indiana	Indianapolis	Aug. 13, 10 a.m.	Install. 6 lamp poles, Marion Co. court house.	Albert Sahn, County Auditor.
Wisconsin	Brownstown	Aug. 17	Furn. and install. 25 h.p. gaso. engine, belt-con. to 18 1-2 kw. generator; furn. and erect. pole line, in running order; \$2,800.	Village Clerk.
MISCELLANEOUS				
Illinois	Chicago	Aug. 8, 11 a.m.	Disposing of street sweepings from 9th, 17th, 18th, 19th and 20th wards and part of 1st ward.	B. J. Mullaney, Comr. Pub. Works.
New York	Brooklyn	Aug. 10	Repairs and alterations to steam boilers and piping in municipal bldg., Hall of Records, Co. Court House and Boro. Hall.	A. E. Steers, Boro. President.

street, to John R. Baxter, Jr., \$27,789.64; fluxed Bermudez asphalt, bound with Cyanite recommended by Supt. Swiggett. Bids were submitted by Harry W. Roberts & Co., N. D. Peters & Son and others, for various materials.

Erie, Pa.—Brick pavement on East Fourth st., German to Parade, to John McCormick & Son; asphalt on W. 22d st., Peach to Chestnut, to William Simpson.

Dallas, Tex.—Curbs and gutters on two streets, to Dallas Hydraulic Brick and Stone Co.

Dallas, Tex.—To Municipal Paving Co., for resurfacing Court House Sq. with asphalt, about \$13,000.

Toronto, Ont., Can.—Paving with asphalt rock portion of College st., to Mr. Maguire, \$74,486.

BIDS RECEIVED

Los Angeles, Cal.—Road from west city limits of Claremont to within one and a half miles of Glendora; rock is to be hauled from the quarry by teams: A. C. St. John, \$14,000 for grading and culverts on one section and \$1.80 ton for laying macadam and on other section, \$12,000 for grading and culverts and \$1.85 ton for laying macadam; first section will require 10,164 tons of rock, and the other 10,403 tons, so that St. John's bid aggregates \$63,540; Rife, Cave & Trenbelle ask \$17,267 and \$15,155 for grading and culverts on respective sections, and \$1.48 and \$1.53 a ton for rock work, aggregating \$63,381; H. H. Rogers submitted bid aggregating \$74,409.

SEWERAGE

Vincennes, Ind.—Board of Works has passed resolutions recommending Council to appropriate \$100,000 to build main trunk sewer lines, reduction plant and pumping stations.

New Orleans, La.—Bond experts Dillon & Hubbard of New York City, have approved issue of \$7,000,000 bonds for sewerage.—Wm. J. Hardee, City Engineer.

Sandusky, Mich.—Citizens have voted bonds for sewers.

Nebraska City, Neb.—City Engineer has been instructed to draft plans and specifications for a new sanitary sewer district which will cost \$50,000 or more.

Rochester, N. Y.—Because plans submitted by city for disposal of its sewage do not provide for sufficient treatment of sewage, State Commissioner of Health Porter has returned them to city authorities as disapproved.

Syracuse, N. Y.—Contract will be let soon

for construction of trunk sewer from E. Colvin st. to Euclid ave.

Allentown, Pa.—Election on \$1,000,000 bonds for house sewerage is being considered.—Jos. Gersbach, Chairman Highway Committee.

South Fork, Pa.—Borough will within a few days ask for bids for furnishing and installation of over two miles of sewer pipe; Borough Council will purchase 11,000 ft. of pipe at once.

Jellico, Tenn.—Citizens will vote Sept. 1 on bonds for installation of sewer system.

Dallas, Tex.—Bids have been ordered advertised for sanitary sewers on Crowds and Main sts.

Spokane, Wash.—Council has passed ordinances for sewers.

CONTRACTS AWARDED

Tama, Ia.—Construction of 4,420 ft. 18-in. sewer, 1,680 ft. 12-in., 1,320 ft. 10-in., 14,230 ft. 8-in. sewer, sewage pumping plant, nine flush tanks, 85 manholes, etc., to Dearborn & Jackson, Cedar Rapids, \$29,996.

Brookline, Mass.—Sewers: Ackers ave., to Dennis Driscoll, \$606; Sheafe st. and Cemetery Drive to same bidder.

Detroit, Mich.—Construction of brick sewer in Dexter blvd., to Wm. Porath, \$8,000.

Dayton, O.—To Larkin Brothers Construction Company, city, sanitary sewer construction work at total bid of \$38,510.45.

Niles, O.—Construction of sub-main and sanitary sewers, Dist. No. 3, to Wm. Lehman, Cleveland, \$21,768.93.

Elk City, Okla.—Constructing sewage purification works, to F. H. Lancashire, Dallas, Tex., \$13,000.

Hazleton, Pa.—Sewers: North Wyoming st. to Jas. Correll, \$2,487; South Wyoming st. to Ario Ruth; James st. to Reed Construction Co., \$3,000; North Vine st., to Ario Ruth, \$1,642; Carson st., to Jas. Correll, \$5,213.35.

BIDS RECEIVED

Dayton, O.—Sewer work to Larkin Bros., city; bids as follows: District 3—Larkin Bros., \$18,251.20; M. O'Herron & Co., \$18,803; T. J. Backus Construction Co., \$18,994.93; Gebhart and Kline, \$25,988.40. District 10—Larkin Bros., \$16,465.05; M. O'Herron & Co., \$17,690.75; T. J. Backus Construction Co., \$17,913.55; Gebhart and Kline, \$23,121. Districts 8 and 9—Larkin Bros., \$3,794.20; Bair and Rhodes, \$4,056.25; T. J. Backus Construction Co., \$4,101.80; M. O'Herron & Co., \$4,503.20; W. H. Boyd, \$4,705.50; Gebhart and Kline, \$5,616.20.

WATER SUPPLY

Sacramento, Cal.—Mayor M. R. Beard has returned to Board of City Trustees without his approval ordinance calling for special bond election to raise \$666,000 for filtration plant.

Sullivan, Ind.—Council has decided to sink 12 wells west of city for water supply.

Sandusky, Mich.—Citizens have voted bonds for water.

McComb City, Miss.—Addition will be made to water works.

Montgomery, Mo.—Citizens have defeated proposed \$25,000 bond issue for water works and sewers.

Windsor, N. Y.—Citizens have voted \$3,500 for improvement of water system.

Port Clinton, O.—City has awarded \$15,000 filtration bonds at \$766.50 premium.

Muskogee, Okla.—City will spend half a million dollars to get best water in the State and the best and cheapest method of supplying it; Consulting Engineers have been employed to recommend to Council the best of three proposed plans, all of which contemplate gravity pressure and elimination of expensive pumping plants.

Aiken, S. C.—City has voted to issue \$78,000 worth of bonds for municipal improvements; Commissioners have been appointed to take charge of water works, etc., to be built with proceeds.

Ogden, Utah.—Citizens will probably vote \$100,000 bond issue for enlargement of water works system; seven miles of extensions are planned, second conduit will be laid from Coldwater Canyon to reservoir, and supply pipes from reservoir to distributing system will be enlarged.—Wm. Glasmann, Mayor.

Provo, Utah.—Consulting Engineer L. C. Kelsey's plans and specifications for a change of the present water works mains to the higher ground on Rock Canyon bench have been adopted; cost \$90,000; amount recently raised in sale of bonds; bids for work will be opened Aug. 29, 3 p. m.

CONTRACTS AWARDED

South Bend, Ind.—To Dodge Mfg. Co., Mishawaka, for furnishing fittings for pumping machinery in new station at Leeper Park, \$825.

Sioux City, Ia.—Laying 800 ft. 16-in. water pipe, to Lewis & Leeder, \$15.75; all pipe and material furnished by Water Department.—K. C. Gaynor, City Engineer.

Batavia, N. Y.—New concrete dam on Tonawanda Creek, to the Herbert Engineering Co., Easton, \$6,094.70; Benjamin F. Speyer, of Buffalo, bid \$11,900.